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STATE-LOCAL GOVERNMENT SPENDING, MACROECONOMIC FISCAL POLICY, AND THE BUSINESS CYCLE

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**STATE-LOCAL GOVERNMENT SPENDING, MACROECONOMIC FISCAL
POLICY, AND THE BUSINESS CYCLE**

A Dissertation Presented

by

AMANDA PAGE-HOONGRAJOK

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

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Economics

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POLICY, AND THE BUSINESS CYCLE**

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AMANDA PAGE-HOONGRAJOK

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DEDICATION

For Somsak and Jane.

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First, I would like to thank my dissertation committee for their guidance and support throughout the years. In particular, I thank my committee chair, Bob Pollin, for his mentorship and faith in my potential. I also thank J.W. Mason for his feedback over countless coffeehouse meetings and his relentless advocacy. I am grateful for Michael Ash's consistent encouragement and optimism.

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ABSTRACT

STATE-LOCAL GOVERNMENT SPENDING, MACROECONOMIC FISCAL POLICY, AND THE BUSINESS CYCLE

SEPTEMBER 2019

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This dissertation investigates state and local government budget behavior over the business cycle with the aim of improving the design and implementation of fiscal policy. It examines how the various components of state-local government budgets have behaved historically and seeks to understand how on-the-ground, practical, and political issues impact state and local government's ability to engage in countercyclical spending.

The first chapter of this dissertation motivates the need to account for state and local government budgets in macroeconomic fiscal policy. It shows that the contemporary macroeconomic fiscal policy literature overlooks the role of state and local government budgets. I argue that it is critical to fill this gap because of the significant impact state and local government budgets can have on overall fiscal policy.

Chapter 2 investigates the behavior of state and local government budgets over business cycles from 1954 to 2015. It classifies each component of state and local government budgets as pro-cyclical, countercyclical, or non-cyclical. This analysis helps

us see clearly which components of state-local government budgets have historically supported countercyclical fiscal policy and which have hindered it.

Chapter 3 examines the effectiveness of state-local government capital spending as a countercyclical tool. Capital spending has the most potential for countercyclical purposes. This chapter identifies institutional and on-the-ground barriers to using capital spending for countercyclical purposes.

Chapter 4 analyzes the role of state and local government spending in the most recent economic recovery from 2010 to 2015. State and local government spending has historically contributed to federal government recovery efforts. However, in the 2010 recovery, state and local government spending became a drag. Analyzing the state-local government slowdown during the 2010 recovery can help us identify the key factors that turned state-local government spending from a supportive source to a barrier.

Chapter 5 develops policy proposals for state and local government countercyclical spending taking into account all the lessons from the previous chapters. I argue that the most promising areas for policy change are: 1) expanding federal government support; 2) reforming rainy day funds; 3) utilizing the capital budget; 4) loosening financial constraints; and 5) addressing political constraints.

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CHAPTER 1

THE IMPORTANCE OF STATE AND LOCAL GOVERNMENT SPENDING FOR THE EFFECTIVENESS OF MACROECONOMIC FISCAL POLICY

1.1 Introduction

In this chapter, I first review the contemporary literature to demonstrate how state and local government's role in macroeconomic fiscal policy has largely been overlooked. Then, I argue it is critical to take state and local government budgets into account for macroeconomic fiscal policy for three main reasons: 1) the potential for state and local governments to undercut federal stimulus attempts; 2) state and local governments spend disproportionately in areas with relatively large output and job multipliers and; 3) state and local governments are likely to spend stimulus funds transferred by the federal government.

1.2 State and Local Governments in Contemporary Fiscal Policy Literature

In the three decades before the Great Recession, the dominant ideology posited that recessions could be managed exclusively by monetary policy. Macroeconomic fiscal policy, particularly increases in government spending financed by fiscal deficits, was largely seen as unnecessary for the management of business cycles. This view was seemingly supported by "The Great Moderation." This was the period between 1982 and 2007 in which overall macroeconomic conditions were broadly stable, and recessions were short and mild. As late as 2007, this view was still widely held by mainstream economists. For example, Christina Romer, a prominent macroeconomist and policy

advisor in the Obama Administration observed that, “Overall, the story of stabilization policy of the last quarter century is one of amazing success” (Romer, 2007, p. 20).

Thus, when the 2007 financial crisis occurred, few economists were in a position to effectively advise the federal government on how to implement a large-scale fiscal stimulus program. Specifically, there were virtually no estimates on the size of the government spending multiplier for different types of countercyclical fiscal spending. Furthermore, there were no studies investigating the practical barriers that could delay stimulus fund spending.

Nevertheless, the crisis and resulting recession forced the federal government to act. This resulted in the passage of the American Reinvestment and Recovery Act (ARRA) of 2009. This was a planned \$782 billion increase in government spending, injected into the U.S. economy over a two-year period, financed by the federal government issuing bonds. The ARRA allocated \$271 billion to transfers to persons, \$190 billion to tax cuts, \$174 billion to state and local governments for Medicaid and education, and \$147 billion to infrastructure and other direct spending (Pollin, 2012, p. 173). The passage of the ARRA produced a surge of macroeconomic research dedicated to analyzing the effects of this program. The research examined 1) government multipliers in general 2) state government multipliers in general and 3) state government multipliers based on specific ARRA budgetary allocations. I discuss each in turn.

1.2.1 General Analysis of Multipliers

Several literature reviews of the size of government spending multipliers were published in the wake of the ARRA. The purpose of these reviews was two-fold: to

approximate the size of the government spending multiplier and develop a set of criteria that would help approximate multiplier size. Ramey (2011) reviews the government spending literature and estimates the deficit-financed government spending multiplier is probably between 0.8 and 1.5 while a range of 0.5 to 2 cannot seriously be rejected (p. 673). In other words, a \$1 increase in government spending leads to an increase in output between \$0.50 and \$2. To a significant extent, this wide range of multiplier estimates reflects the different conditions under which debt-financed increases in government spending have occurred. Thus, we can anticipate that multiplier effects will be larger if the initial government spending does not crowd out other types of spending and if transfers are spent by the recipients of the government funds, as opposed to households or businesses increasing their level of saving. More specifically, a debt-financed increase in government spending is likely to lead to larger increases in output if: 1) government spending does not replace private spending; 2) there is excess capacity in the macroeconomy; 3) households are liquidity constrained in meeting their spending needs; 4) the government itself is not financially constrained, i.e. facing heavy debt servicing costs prior to the debt-financed spending injection; and 5) expansionary monetary policy accompanies the stimulus (Pollin, 2012).

In addition, Whalen and Reichling (2015) demonstrate that the size of the government spending multiplier depends on the *type* of government spending. They conclude that direct purchases of goods and services by the federal government and transfers to state and local governments have the largest estimated multipliers, with the range of the multipliers in this case being between 0.4 and 2.5 (p. 11). Tax cuts for higher-income people, extension of homebuyer credits, and corporate tax cuts have the

lowest estimated multiplier with a range of 0 to 0.8. This is because tax cuts are less likely to encourage spending and investment. For example, higher-income people are less likely to spend the money saved from tax savings and corporations are less likely to invest the money saved from tax cuts.

1.2.2 Multipliers for State and Local Spending

The large transfers to state governments motivated a new strand of multiplier literature that sought to investigate state government multipliers. State government spending multipliers measure the impact of an increase in state spending on state output. For example, Shoag (2010) uses unexpected state pension portfolio returns to study what happens to state income and employment when states increase their level of spending relative to their steady-state baseline. He finds that an additional \$1 of spending is associated with an increase in state income of \$2.12 (p. 1). He also finds that \$35,000 of spending creates approximately one additional job. Chodorow-Reich (2017) reviews the general literature on state government multipliers and estimates the state government multiplier to be 1.8 (p. 1), meaning a \$1 increase in state government spending is associated with a \$1.80 increase in state income.

1.2.3 State and Local Government Multipliers for Specific ARRA Programs

Because the federal transfers to state and local governments were very large under the ARRA, even when the transfers were divided into different programs, the increase in spending was enough to significantly affect output and employment in the states. Wilson (2012) investigates the impact of the federal transfers for state highway spending. He

found that \$1 million in ARRA spending created 8 jobs (p. 251). This translates to \$125,000 per new job created. Chodorow-Reich et al. (2012) examine the impact of federal Medicaid transfers to state governments. They estimate a \$100,000 increase in Medicaid transfer funds was associated with a 3.8 increase in employment or roughly \$30,000 per job (p. 118). The two studies do not directly discuss why their estimates vary so significantly from each other but some of the research in this dissertation sheds light on this issue. Wilson was looking specifically at highway spending which consists mainly of capital project spending. This type of spending can be lagged significantly. This may potentially explain why Wilson's estimates of spending and employment multipliers were much lower than Chodorow-Reich et al.'s estimates.

This brief review of contemporary macroeconomic fiscal policy literature has demonstrated that although there has been some movement toward including state and local governments in macroeconomic fiscal policy discussions, there is still much to be learned. In particular, there are virtually no studies that seek to investigate potential on-the-ground barriers to countercyclical spending or political determinants of state-local government spending. My dissertation broadly contributes to this literature by explicitly emphasizing the role of state and local government expenditures in macroeconomic fiscal policy.

1.3 The Need for State and Local Governments in Macroeconomic Fiscal Policy

The behavior of state and local government budgets can impact the overall effectiveness of macroeconomic fiscal policy. Specifically, I discuss three ways in which state-local government spending can support or dampen fiscal stimuli. First, pro-cyclical

state and local government spending can potentially cancel out a federal government stimulus. Pro-cyclical in this context means increased state-local government spending during economic expansions and decreased state-local government spending during recessions. If pro-cyclical state-local government spending is underestimated or not accounted for at all, a federal government stimulus will be less effective, all else equal. Second, the composition of state and local budgets is well suited for countercyclical spending. State and local governments are the main providers of education, healthcare, and infrastructure within the U.S. economy. These areas of spending have the largest output and job multipliers relative to other types of spending. Furthermore, the countercyclical spending would represent long-term investment in human and physical capital for the country. Third, arguments that state and local governments should not be involved in fiscal policy have been largely invalidated by the growing literature around the American Recovery and Reinvestment Act (ARRA). The discussion in this chapter motivates the purpose of the rest of the dissertation – to better understand state and local government budget behavior over the business cycle to improve the design and implementation of future macroeconomic fiscal policy.

1.3.1 Size and Cyclicity of State-Local Government Spending

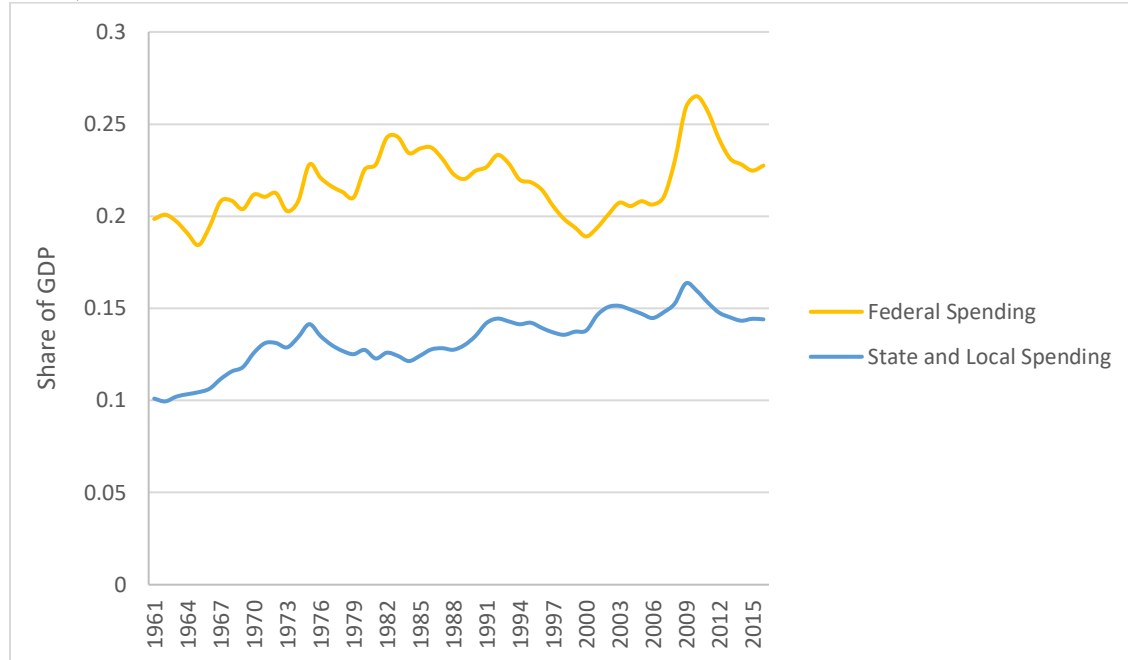
The first reason to examine state and local government spending when developing fiscal policy is that pro-cyclical state-local government spending could potentially counteract a federal government stimulus. The plausibility of this scenario depends on the size of the state-local government sector and the cyclicity of its spending. I discuss each component in turn.

The federal government is usually thought of as “the” government but in reality people engage with state and local governments far more often. State and local governments are responsible for administering and managing essential public services. Public safety, utility services, and infrastructure are all sponsored by state and local governments. Local property taxes fund public schools and state taxes fund public state universities. Local governments oversee public parks and libraries while state government handle larger programs like Medicaid. To provide these vital services, state and local governments must spend money.

The aggregate state-local government sector represents all of the fifty state governments and 90,000 local governments combined. Figure 1.1 shows the sector’s total spending was about 15% of GDP in 2016. In contrast, federal government spending total spending was about 23% for the same year. Figure 1.1 also shows that the state-local government sector’s spending has risen from about 10% of GDP in 1961 to about 15% in 2016 while federal government spending has only grown from about 20% of GDP in 1961 to about 23% in 2016.

Figure 1.2 presents total spending net transfers and interest. This effectively represents the sum of consumption and investment spending, the only types of spending that are accounted for in GDP. This netting reverses the relative sizes of the federal and state-local government sector. Figure 1.2 shows that since 1972, the state and local government sector’s consumption and investment spending has been larger than the federal government. State and local government consumption and investment spending has remained fairly constant around 12% of GDP where federal government consumption and investment spending has fallen from about 12% in 1970 to less than 7% in 2016.

Figure 1.1: Federal and Aggregate State-Local Government Total Spending as a Share of GDP, 1961-2016



Source: Bureau of Economic Analysis

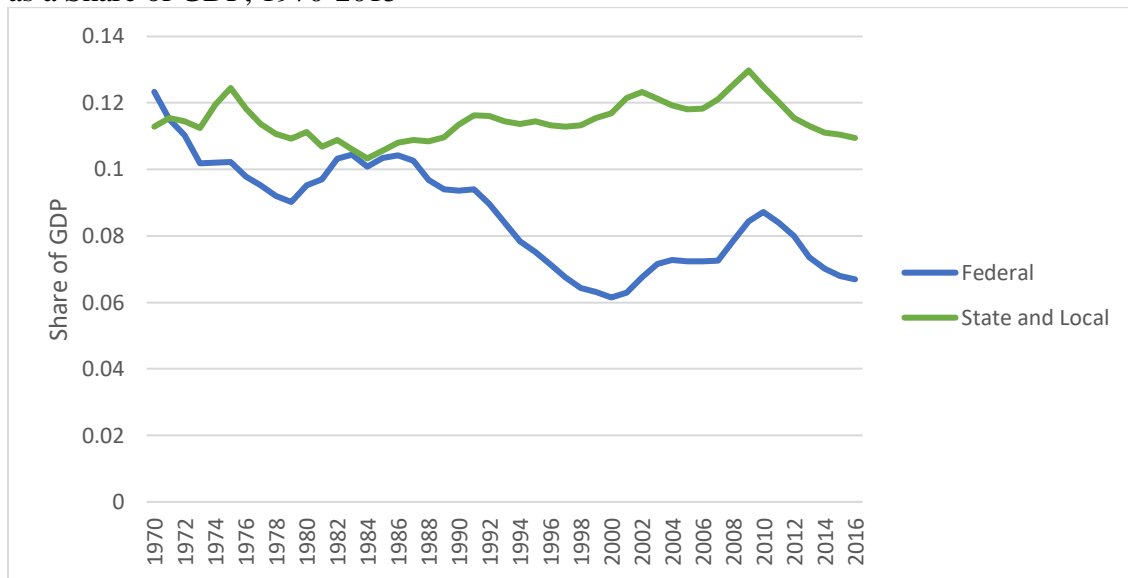
Figure 1.2 presents total spending net transfers and interest. This effectively represents the sum of consumption and investment spending, the only types of spending that are accounted for in GDP. This netting reverses the relative sizes of the federal and state-local government sector. Figure 1.2 shows that since 1972, the state and local government sector's consumption and investment spending has been larger than the federal government. State and local government consumption and investment spending has remained fairly constant around 12% of GDP where federal government consumption and investment spending has fallen from about 12% in 1970 to less than 7% in 2016.

State and local governments are not only important for the services they provide. The sheer size of the state-local government sector as a share of the economy requires that we pay attention to its role for macroeconomic stability. Figure 1.2 demonstrates the aggregate state-local government sector clearly has the capacity to neutralize federal

government stimulus attempts. However, if state-local government spending operated on a countercyclical basis, the size of the sector would not matter. It is only the combination of a substantial state-local government sector along with broadly pro-cyclical spending patterns that could potentially dampen federal government attempts to stimulus the economy during a recession.

Prior studies on state and local government budgets indicate state-local spending operates on a pro-cyclical basis – increasing during economic expansions and decreasing during recessions.

Figure 1.2: Federal and Aggregate State-Local Government Consumption and Investment as a Share of GDP, 1970-2015



Source: Bureau of Economic Analysis

The Government Accountability Office (2011) utilized data from the U.S. Census of Governments to decompose the aggregate state-local sector’s budget components into their long-run trends and cyclical deviations. The results from this analysis indicated general expenditures, current expenditures, and capital expenditures operated on a pro-cyclical basis. Specifically, their correlation coefficients with real GDP were

respectively, 0.34, 0.23, and 0.50 (p. 16). The GAO used the same methodology to examine how revenues for the state-local government sector behave over the business cycle. Their results suggest that state-local government revenues operate on a generally pro-cyclical basis.

Hines, Hoynes, and Krueger (2001) come to similar conclusions using U.S. Census of Governments data to regress total spending, capital spending and various other types of spending on personal income and population. Their results indicate a doubling of state personal income is associated with 18% higher total spending (p. 37). Their results are robust to changing personal income to the unemployment rate.¹

The pro-cyclicality of state-local government spending is influenced by constitutional rules, institutions, politics, and communities. Thus, it is not accurate to simply attribute all of state-local government spending behavior to revenue fluctuations. Nor is it accurate to say that the level and growth of state-local government spending is entirely bounded by the level and growth of revenue.

Balanced budget rules represent the most stringent example of spending restriction due to revenue collection. These rules legally require that expenditures equal revenues, but only to varying degrees as I discuss below.² If such rules were completely binding, it may not be fruitful or interesting to investigate state-local spending's impact on fiscal policy because its behavior is largely fixed. Spending would simply be determined by revenue. However, state and local governments do routinely run annual

¹ Other studies find similar pro-cyclical results, e.g. Follette and Lutz (2010); Clemens and Miran (2012).

² Vermont is the only state that does not have some form of balanced budget rule.

deficits and surpluses (National Conference of State Legislatures, 1999). There are four reasons for this. I discuss each in turn.

First, the stringency of balanced budget laws varies across states. The balanced budget laws may require the governor's proposed budget be balanced (43 states), the budget the legislature passes much be balanced (39 states), and the budget must be balanced at the end of every fiscal year so that no deficit can be carried forward (National Conference of State Legislatures, 1999). Furthermore, in some states, the balanced budget rule is not an explicit law, but rather an interpretation of the law. Second, balanced budget rules only apply to operating budgets and not capital budgets. Operating budgets are current revenues and current expenses. Capital budgets are for capital expenditures which are largely financed by debt. Theoretically, state and local government can circumvent balanced budget requirements by spending on capital projects. Third, states can adjust asset positions to cover a deficit or use up surplus funds. Selling state assets, delaying payments to vendors, or drawing down rainy day funds can free funds for expenditures. Page-Hoongrajok, Mason, and Jayadev (2018) show that states have in the past adjusted to fiscal imbalances by selling or buying assets. Finally, there are no legal penalties to violating a balanced budget rule. The National Conference of State Legislatures (NCSL) states the primary enforcement mechanisms are not allowing deficit rollovers or limiting the issuance of debt (1999).

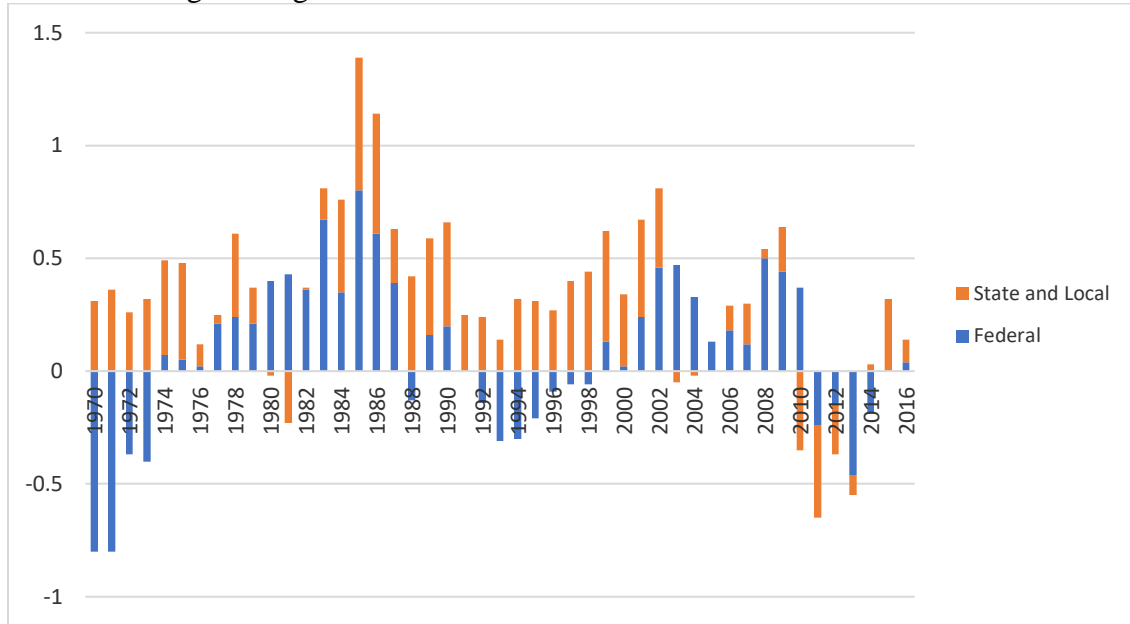
Institutions can influence state and local government spending behavior over the business cycle, regardless of revenue. The Federal Reserve and credit rating agencies are two primary examples. The Federal Reserve can reduce the federal funds rate, in the hopes of bringing down other interest rates and making it easier for all sectors to borrow.

This action would clearly support countercyclical efforts. On the other hand, credit rating agencies may work in the opposite direction. Although credit rating agencies have no legal authority over state and local governments, they have complete control over the credit rating given to each government's debt. In some cases, this may be enough to pressure state and local governments from borrowing in circumstances in which the governments think borrowing is warranted.

Politicians and the political commitments they represent can also influence state-local government spending independent of revenue. Politicians can campaign on platforms of small, limited government. These types of fiscal models usually contract the number of government employees, their pay, and benefits. If any expansionary policy is implemented under these models, it is often in the form of tax cuts and not increased government spending. Thus, it is plausible that specific type of fiscal models can support or mitigate state and local government attempts to spend countercyclically.

Perhaps because of the pro-cyclicality of state and local government fiscal policy, much of the focus of fiscal policy has historically been on the federal government. However, I argue it is a mistake to not account for the spending behavior of state and local governments when designing and implementing fiscal policy. The pro-cyclicality of state and local government spending will produce a natural drag on any stimulative efforts made by the federal government. A federal stimulus combined with a state and local government drag might have no observable effect if that drag is sufficiently large. Figure 1.3 shows both federal and state-local government contributions to percentage changes in real GDP. It is clear in some years the state-local government sector nets out most or all of the federal government contribution.

Figure 1.3: Federal and Aggregate State-Local Government Contributions to Year-over-Year Percentage Change in Real GDP



Source: Bureau of Economic Analysis

This motivates the need to understand the cyclicity of the different types of state and local government spending, how strongly cyclical each type of spending is, and what causes the different types of spending to be pro-cyclical or countercyclical. I return to this question in Chapter 2.

1.3.2 State-Local Government Budget Composition

The second reason to consider state and local governments when developing fiscal policy is that they disproportionately engage in the types of spending associated with the largest output and job multipliers. This means that for each dollar of state-local government spending, the increase in GDP is greater than a dollar spent on a different type of fiscal stimulus. Any serious fiscal stimulus should focus on supporting and

expanding the aspects of state and local governments that produce the most jobs and output for a given increase in spending.

One of the largest responsibilities of state and local governments is to build and maintain the nation's infrastructure. State and local governments have historically been responsible for about 75% of nondefense infrastructure investment in the United States. The American Recovery and Reinvestment Act (ARRA) of 2009 sought to use state-local government capital spending as a way to stimulate the economy. Specifically, a major goal was to accelerate investment spending via what were termed "shovel-ready" projects (Furman, 2018, p.16). These were projects that were supposed to be ready for construction at the time the stimulus program was enacted. In December 2008, President Obama popularized the term "shovel-ready" projects to describe how the ARRA will increase state and local government spending and create jobs. There were over 4,000 news stories on shovel-ready projects between November 2008 and March 2009 (Jones and Rothschild, 2011). Obama (2008) stated:

Well, I think we can get a lot of work done fast. When I met with the governors, all of them have projects that are shovel-ready, that are going to require us to get the money out the door, but they've already lined up the projects and they can make them work. And now, we're going to have to prioritize it and do it not in the old traditional politics first wave. What we need to do is examine what are the projects where we're going to get the most bang for the buck, how are we going to make sure taxpayers are protected.

Clearly, in this case, state and local governments were being relied upon to provide immediate stimulus to their local economies through the construction of shovel-ready projects. Capital spending, however, is not the only component of state-local government budgets that has countercyclical potential.

The other key services of state and local governments – education, healthcare, and public safety – are industries that produce relatively more jobs for a given amount of money spent. An IMF study decomposed government spending effects on output across OECD countries, and concluded that education and healthcare spending increase economic growth whereas other types of spending do not (Afonso and Jalles, 2014). Fischer (1997) review the literature on the relationship between different types of public spending (education, public safety, and highway) and economic development which is categorized into employment indicators, income, or new businesses. The studies reviewed demonstrate conflicting evidence but the most consistent finding is positive employment effects in response to education and public safety spending. Bivens (2003) calculates employment multipliers for the major industries in the US. The employment multiplier he calculates has a different interpretation than what we will pursue – the figures he estimates show how many jobs would be lost in other industries due to job loss in a given industry. Still, the study demonstrates that state and local governments have the least associated job loss due to job loss in other industries like manufacturing and retail trade. These studies demonstrate that different types of spending can lead to different employment impacts. In particular, education and healthcare seem to produce greater positive growth effects in terms of output and employment.

Table 1.1 summarizes Peltier’s (2017) employment multiplier estimates categorized by type of spending. To analyze the differential job creation impacts of different types of spending, she used the U.S. Department of Commerce’s input-output model of the U.S. economy. The input-output model documents how much of every input goes into a given output. Just as different types of fiscal stimulus (tax cuts vs. transfers to

state and local governments) can produce different impacts on output, different types of government spending can produce different employment impacts. Her results show that for \$1 million in education spending, healthcare spending, and infrastructure spending, 15.2, 14.3, and 9.8 jobs would be created. This is compared to 6.9 jobs created per \$1 million in federal defense spending.

Table 1.1: Employment Multiplier Estimates by Type of Spending

Type of Spending	Employment Multiplier (Number of jobs created per \$1 million in spending)
Federal Defense	6.9
Clean Energy	9.8
Overall Education	15.2
Higher Education	11.2
Elementary and Secondary Education	19.2
Healthcare	14.3
Infrastructure	9.8

Source: Peltier, 2017

Pollin and Garrett-Peltier (2011) use an accounting identity to explain why the jobs multipliers can vary for different types of spending. First, the more labor intensive a job is, the more workers will be necessary to produce a given amount of output. This means increased spending in industries that are not likely to be dominated by capital spending is likely to translate into hiring workers and not buying equipment. Second, industries with supply chains that are primarily in the U.S. will contain the benefits of the spending inside the country. For example, military personnel abroad spend money in other countries, lowering the induced job creation potential domestically. Third, the amount workers are paid will determine how many jobs can be created for a given amount of spending. If \$1 million is spent and the compensation per employee in a

certain industry is \$100,000, only ten jobs will be created. However, if the compensation in another industry is on average \$50,000, then twenty jobs (twice the amount) would be created for the same amount spent. The largest sectors of state and local governments by spending and employment are industries that are labor intensive, not likely to be outside of the country, and decently paid jobs – all factors that contribute positively to job creation.

Output and employment multipliers are relatively greatest for the sectors that dominate state and local governments. This is an incentive to try and incorporate state and local government spending into the design and implementation of a countercyclical stimulus program. However, if state and local governments did not spend the federal transfers they were given, the advantage of large state-local government multipliers would not matter. This question – whether or not state and local governments actually spend the transfers they receive from the federal government – is investigated in the next section.

1.3.3 State-Local Governments and Federal Transfers

The third reason to consider state and local government spending when developing fiscal policy is that a growing literature which studies the effects of the American Recovery and Reinvestment Act (ARRA) shows state and local government might spend federal government transfers to a large extent. Although state and local governments face constraints to provide countercyclical stimulus, the federal government can provide aid to state and local governments. These intergovernmental transfers have the potential to help stimulate local economies. Despite the potential importance of state

and local government behavior on the magnitude of the multiplier, the literature exploring this topic is thin and far from conclusive. The lack of reliable research was demonstrated in the debates during the development of the stimulus package contained in the 2009 American Recovery and Reinvestment Act. John Boehner, Republican House Minority Leader, stated at the time that channeling funds to state and local governments would not have any stimulus effect while the Obama administration on the other hand were predicting job creation on the scale of hundreds of thousands (Chodorow-Reich et al., 2012, p. 119).

It is important to take the spending behavior of state and local governments into account in estimating the multiplier, as this behavior may have a significant impact on the size of the multiplier. For example, if state and local governments save transfers from the federal government, the overall effect of the stimulus on GDP will be attenuated, thus decreasing the magnitude of the government spending multiplier, and vice-versa.

One of the earliest empirical studies looking at the behavior of state and local governments upon receiving a federal transfer in an economic downturn was conducted by Edward Gramlich in 1978. He investigated why state and local budget surpluses were so high after the 1975 recession. The federal government channeled funds to state and local governments expecting these funds to be immediately spent. This would then produce broad multiplier effects that would in turn yield changes in GDP larger than the initial aid granted. Gramlich shows states did not spend most of the funds. Rather, the states used the federal transfers to reduce their debt. In particular, for each dollar of federal grant, state and local governments spent between \$0.09 and \$0.18 in the initial quarter that the federal grants were received (Gramlich, 1978, p. 202).

Using the same methodology in his 1979 paper, Gramlich finds similar results: \$1 of the federal countercyclical revenue sharing program (CRS) is associated with \$0.03 in state-local expenditures in the short-run and \$0.36 in the long-run (p. 182). The short-run is defined as the first quarter that the state-local governments received the federal transfers. The long-run is defined as the tenth quarter after the federal transfers were received. However, he chooses to present net figures (state and local spending with federal transfers minus spending without the transfers). The net figures on expenditures are relatively small but the gross figures are quite large. The net figures are small due to the relatively high drop in expenditures that would have happened without federal assistance. In his 1979 paper he briefly mentions the possibility of the federal assistance being understated due to state and local governments simply maintaining their levels of spending but this does not change his conclusion that federal grants to state and local governments are a poor choice for economic stabilization.

More recently, Cogan and Taylor (2011) argue along the lines of Gramlich and find similar econometric results. Specifically, they regress state expenditures on the previous year expenditures, revenues, and federal transfers, finding the coefficient on federal transfers to be statistically significantly zero. In other words, the amount of federal aid given to a state did not alter its expenditures. Instead, they argue states simply reduce their indebtedness. Cogan and Taylor assume state and local governments behave in a particular way. They assume state and local governments, like households, engage in “rational expenditure smoothing” which means they will borrow or draw down savings to maintain their optimal level of expenditure in the face of current revenue shortfalls. If this is the counterfactual then we’d want to see a statistically significantly positive coefficient

on ARRA stimulus variable. However, if our counterfactual is that states would have severely cut spending in the absence of ARRA funds, then a statistically significant zero coefficient is evidence the stimulus was “successful”.

Marglin and Spiegler (2013) directly critique the econometric methods employed by Cogan and Taylor and others who have used similar methods. Their critique is both theoretical and technical. The Cogan and Taylor coefficient on transfers is not statistically significantly different from zero. However, Marglin and Spiegler argue that if we assumed, counterfactually, that without the stimulus states would have deeply cut expenditures, a coefficient of zero is actually evidence the stimulus worked. Correcting for serial correlation and conducting their own analysis of the same data used by Cogan and Taylor, they find state governments actually spent two-thirds of the ARRA funds funneled through the states. They supplement their empirical results with qualitative evidence from state budget officers who, on the whole, state that without the ARRA funds their states would have cut spending even further than they did.

The results of the most recent, updated analyses of the effects of federal government transfers suggests that the evidence on the matter is mixed. There are alternative perspectives on the effectiveness of the ARRA transfers represented respectively by Cogan and Taylor and Marglin and Spiegler. The outstanding question of what state and local governments do with federal transfers they receive will be a primary question this dissertation seeks to answer.

The foregoing evidence, then, suggests it is necessary to consider state and local government spending behavior in macroeconomic fiscal policy. Broadly, considering state and local government spending behavior can help us better understand multiplier

effects and the size of the multiplier. Specifically, state and local governments are important for fiscal policy because 1) the size and pro-cyclical nature of the sector can neutralize federal countercyclical actions; 2) state and local government spending has relatively large output and employment multipliers; and 3) recent evidence suggests that the evidence on state and local governments spending federal transfers is mixed. Failure to take the behavior of state and local government spending into account when designing fiscal policy can understate or even neutralize federal government attempts to stimulate an economy in a recession.

This chapter argued state and local government spending can impact the size of the multiplier and the overall effectiveness of macroeconomic fiscal policy. The next three chapters will examine, in detail, the behavior of state and local budgets over business cycles. The findings from these analyses will then be used to develop ways to improve the design and implementation of macroeconomic fiscal policy.

CHAPTER 2

STATE-LOCAL GOVERNMENT BUDGETS OVER THE BUSINESS CYCLE

2.1 Introduction

This chapter investigates state and local government spending behavior over historical recessions and recoveries. The two central questions of the chapter ask 1) how state-local government spending behaves over historical business cycles and 2) what components drive that behavior.

Examining these questions is critical to the successful implementation of countercyclical stimulus efforts. The investigation of how the major components of state and local government budgets behave over the business cycle can identify which spending and revenue streams are pro-cyclical and countercyclical. Furthermore, exploring what drives this behavior can yield helpful insights towards making countercyclical spending more feasible on the state and local government level.

I draw on two distinct methodologies to investigate these issues. To identify how state and local government budget behave over historical business cycles, I decompose each spending and revenue's time series into a long-run trend and cyclical deviation. I then use the correlation between each budget component's cyclical deviation and the output gap (deviation of output from its long-run trend) to categorize each spending and revenue component as pro-cyclical, countercyclical, or neutral. To examine what budget components drive overall spending behavior, I utilize a covariance matrix. The covariance matrix estimates how much of total spending's variation can be explained by the other budget components. Specifically, it shows how much of the other budget components' variation is shared with overall spending variation.

The paper's analysis yields some important implications for state-local government fiscal policy. The investigation of how the major components of state and local government budgets behave over the business cycle identified which spending and revenue streams were pro-cyclical and countercyclical. Specifically, I find that capital spending is weakly pro-cyclical. It is significantly less likely to decrease during a recession than spending for current expenses like wages. This suggests that state and local governments could potentially turn to capital spending for countercyclical stimulus. Furthermore, I find that education spending, particularly elementary school spending, is the least likely candidate for countercyclical spending on the state and local government level. Education spending is highly pro-cyclical, meaning out of all of the different types of state-local government spending, it decreases most severely during a recession. This finding implies that substantial federal transfers may be needed just to keep education spending at pre-recession levels.

In terms of what drives state-local spending behavior over historical business cycles, I find that federal transfers and property taxes can explain about 37% of the variation in overall state-local spending. Federal transfers and property taxes behave countercyclically, meaning they increase during economic downturns. This result suggests that the variation in federal transfers and property taxes over time are critical factors to understand the variation in total expenditures over time.

The paper is outlined as follows. Section 2.2 reviews the relevant literature on the cyclicity of state and local government budgets. It discusses the approaches previous studies on state and local government budgets have taken as well as how my research contributes to this strand of the literature. Section 2.3 discusses the main data used

throughout the chapter and the main methodological tools. Section 2.4 presents a basic, descriptive analysis of state and local government budgets. This analysis is necessary to identify any adjustments that must be made before engaging in the main analysis of the chapter. Section 2.5 presents and discusses the main results from the time series decomposition and the covariance matrix. Section 2.6 concludes by summarizing the main results in terms of countercyclical spending on the state and local government level.

2.2 Literature Review

This section provides an in-depth review of the current literature on state-local government budget cyclicity. The purpose of this section is to take stock of what work has already been conducted in this area and outline how my research fits into this literature. First, I discuss the main methodologies and findings of previous studies on state-local government expenditure and revenue cyclicity. Then, I briefly describe the contributions of my analysis to the existing studies. I conclude this section with a discussion of balanced budget rules. Specifically, I address why it is still interesting and important to consider the cyclicity of state-local government spending even when accounting for balanced budget rules.

2.2.1 State and Local Government Budgets Cyclical Orientation

State and local governments contribute to business cycles through their spending and tax policies. Spending can be used actively along with tax rate adjustment as fiscal tools to help promote economic stabilization in downturns. Countercyclical fiscal policy is usually considered a responsibility of the federal government. One reason for this is the

belief that state and local government spending operates on a pro-cyclical basis – increasing during expansions and declining during recessions.

The Government Accountability Office (2011) utilized the U.S. Census of Governments data from 1977-2008 to decompose state and local government revenue streams into their long-run trends and cyclical components. They found that these revenue streams are largely pro-cyclical, with the exception of federal transfers. The correlation between the cyclical component and the output gap ranged between 0.49 and 0.64 depending on the revenue series (p. 46). They also found current expenditures and capital outlays to be pro-cyclical but public welfare and healthcare spending to be countercyclical. Specifically, the correlation coefficients for general expenditure, capital outlays, and public welfare spending to GDP were, respectively, 0.34, 0.50, -0.31 (p. 16). To develop business cycle dates, the GAO calculated GDP deviation from long-run trend by 1) linearly de-trending natural logarithms 2) Baxter-King bandpass filter a filter 3) and a Christiano-Fitzgerald random walk bandpass filter.

Hines, Hoynes, and Krueger (2001) come to similar conclusions using a panel of all fifty U.S. states from 1977-1997 to regress total spending, capital spending and various other types of spending on personal income and population. They find increases in state income is associated with higher total spending and higher capital spending. Specifically, a doubling of state personal income is associated with a 18% increase in state spending (pg. 37). A doubling of state population is associated with a 67% increase in state spending. A doubling of state income is associated with an 81% increase in capital spending (p. 38). Their results are robust to changing personal income to the unemployment rate and also to the addition of state and year dummies. One of the paper's

conclusions is that since personal income is positively related to capital spending, it must be the case that governments cut back on capital projects in bad times. The overall conclusion is that major government spending programs are pro-cyclical.

Marlowe (2012) discusses capital spending and its relationship to the business cycle. He concludes state capital spending has historically been managed pro-cyclically. He uses the Bureau of Economic Analysis's National Income and Product Accounts (NIPA) to analyze state-local government capital spending. His choice of data was predicated on the fact that the U.S. Census of Governments did not have 2009 data available. He finds evidence of capital spending decreasing during the Great Recession. One conclusion of the paper is that, "Capital spending, especially for typical operations and maintenance is considered 'postponable' as a common target for cutbacks during recessions" (Marlowe, 2012, p. 663). However, unlike Hines, Hoynes, and Krueger, Marlowe questions the usefulness of decreasing capital spending during a recession. He notes the latest recession offers some evidence that state and local governments are becoming increasingly aware of their local stimulus capacity.

McNichols (2012) discusses the mechanisms that produce pro-cyclical spending. When faced with fiscal imbalances state and local governments rely on these five main areas of adjustment: 1) increase revenue through raising tax rates or coverage 2) cut spending 3) decrease assets 4) increase borrowing 5) rely on federal transfers. McNichols (2012) shows between 2008-2012 state governments engaged mostly in spending cuts (45%), emergency aid (24%) and tax increases (16%) with the rest of the adjustments coming from rainy day funds (9%), and other sources (7%). Furthermore, she shows after ARRA funds were exhausted, spending cuts composed the bulk of the adjustment:

spending cuts (76%), emergency aid (4%), taxes and fees (12%), rainy day funds (4%), other (5%). This suggests the main actions available and used by state and local governments are pro-cyclical: spending cuts and increases in taxes during downturns.

The revenue cyclical literature argues U.S. states have become increasingly dependent on cyclically sensitive revenue streams which heavily contributed to fiscal stress during the most recent recession. Specifically, income tax revenue has itself become more cyclically sensitive and the share of state revenue coming from income taxes has grown over time. Furthermore, studies show the increase in tax revenue volatility is mostly due to the volatility of the tax base and not tax rates. The following discussion outlines a few key studies in this literature.

McGranahan and Mattoon (2012), motivated by the severe decline in state and local revenue from the mild 2001 crisis, ask if the state revenue patterns from the two most recent recessions can be traced to state government revenue becoming more sensitive to economic conditions. They find the responsiveness of state revenue to the business cycle has increased since 1990s. This is mostly due to increased cyclical of the tax base which in turn can be attributed to increased cyclical of investment income. In particular, they find the individual income tax revenue elasticity tripled from 0.6 (pre-2000) to 2.2 (post-2000) (p. 103). Even more specifically, the tax base (adjusted gross income, or AGI) doubled in income elasticity primarily because the elasticity of the investment income component of AGI increased from 0.5 to 5.6 from pre-2000 to post-2000 (p. 107). These results suggest that revenue behavior may be mechanically determined (responding to loss of income) rather than political.

Kodrzycki (2014) extends the McGranahan and Mattoon analysis looking across states. She finds most states experienced increased revenue cyclicity in the 2000s, personal income tax revenue was more cyclical than sales tax revenue, the main source of variation being cyclical sensitivity of resident income (AGI as reported on federal tax returns). She mostly confirms McGranahan and Mattoon's results, though she finds that AGI and its wage and salary subcomponent did not become more cyclical post-2000 when using personal income per capita as a business cycle indicator (vs. coincident index). These results suggest the underlying behavior of personal incomes is driving income tax sensitivity to the business cycle.

Chernick et al. (2014) examine tax structure and revenue stability during the Great Recession. They hypothesize progressive tax structures are more vulnerable to economic downturns but find the "most important source of variation is differences in income concentration and capital gains shares in the top 5% of taxpayers" (p. 1). These findings suggest taxing upper income taxpayers pro-cyclically will not yield excess revenue. If incomes at the top are very sensitive to the business cycle, their incomes decrease heavily during downturns, meaning the state and local tax base shrinks. In this scenario, even if there is a high tax rate, state governments won't have much to tax. Their results again suggest the revenue loss can be attributed to mechanical factors such as the loss of incomes.

Perhaps because of the noted pro-cyclicality of state and local government budgets, much of the focus of fiscal policy has historically been on the federal government. During a recession, countercyclical policy is conducted through increasing government spending and cutting taxes. The pro-cyclicality of state and local government

expenditure noted above, however, will produce a natural drag on any stimulative efforts made by the federal government. Indeed, a federal stimulus combined with a state and local government drag might have no observable effect if that drag is sufficiently large. This is why it is critical to understand the cyclical dynamics of state and local government budgets. For successful countercyclical stimulus efforts, policymakers need to know what happens to state-local government revenues and spending during a downturn. They need to know what types of revenue and spending fall and if any policy action could prevent these streams from falling.

2.2.2 Contribution

My major contribution to this literature is investigating why state-local spending behaves as it does over the business cycle. I also extensively go beyond the existing analysis of how state-local spending behaves in three ways: I utilize a much longer time series than prior studies, I utilize a different de-trending method than prior studies, and I analyze significantly more variables than prior studies.

2.2.3 Balanced Budget Rules

Isn't it useless to study the cyclical nature of state-local government spending because balanced budget rules legally force governments to spend only as much as the revenue they receive? I argue that it is not useless to study the cyclical nature of state-local governments, even if balanced budget rules are taken into account.

Balanced budget rules represent the most stringent example of spending restriction based on revenue collection. These rules legally require, to varying degrees,

that expenditures equal revenues. If such rules were completely binding, it may not be fruitful or interesting to investigate state-local spending's impact on fiscal policy because its behavior is largely fixed. However, state and local governments do routinely run annual deficits and surpluses. There are four reasons for this. I discuss each in turn.

First, the stringency of balanced budget laws varies across states. The balanced budget laws may require the governor's proposed budget be balanced (43 states), the budget the legislature passes much be balanced (39 states), and the budget must be balanced at the end of every fiscal year so that no deficit can be carried forward (National Conference of State Legislatures, 1999). Furthermore, in some states, the balanced budget rule is not an explicit law, but rather an interpretation of the law. Second, balanced budget rules only apply to operating budgets and not capital budgets. Operating budgets are current revenues and current expenses. Capital budgets are for capital expenditures which are largely financed by debt. Theoretically, state and local government can circumvent balanced budget requirements by spending on capital projects. Third, states can adjust asset positions to cover a deficit or use up surplus funds. Selling state assets, delaying payments to vendors, or drawing down rainy day funds can free funds for expenditures. Page-Hoongrajok, Jayadev, and Mason (2018) show that states have in the past adjusted to fiscal imbalances by selling or buying assets. Finally, there are no legal penalties to violating a balanced budget rule. The National Conference of State Legislatures (NCSL) states the primary enforcement mechanisms are not allowing deficit rollovers or limiting the issuance of debt (1999).

As this section discusses, state and local government expenditures are not solely explained by revenue. Therefore, the main questions of this chapter 1) how cyclical are

state-local government expenditures and; 2) what drives state-local government spending, are not only valid questions, but important ones as well.

2.3 Methodology

In this section, I discuss my primary data and methods of analysis. The two methodological tools I employ are time series decompositions and a covariance analysis. The time series decompositions are used to investigate how the components of state and local government budgets have behaved over business cycles. The covariance analysis is used to investigate why the budget components behave as they do over the business cycle. In this section, I first discuss the data from which these two analyses are developed. I then describe the time series decomposition methodology. I end with a brief theoretical discussion of the covariance matrix. The practical application of the covariance analysis is discussed at length in Section 2.5.

2.3.1 Data

The data in this chapter comes from the United States Census of Governments and Annual Survey of State and Local Government Finances.³ Every five years a full census of governments is completed which records about 300 financial variables for all 50 state governments and 90,000 local governments. In the interim years, the data for local governments is generated from a sample. Since the population of states is small, even during the interim years, the state-level data represents a true census.

³ Henceforth referred to as “Census of Governments”.

A key difference between the state and local government data collected by the Census of Governments and the Bureau of Economic Analysis (BEA) state and local government data is that the latter only has data on an aggregate basis. In other words, the BEA only has data for the state and local government sector (all state and local governments combined), the state government sector (all state governments combined), and the local government sector (all local governments combined). The Census of Government data contains not only these aggregates, but also data on a cross-sectional basis. This means there is data for each state and its local governments.

One drawback of the Census of Governments data is that it treats pension fund revenues as a component of total revenues (U.S. Bureau of the Census, 2006, p. 4-47). This means that any capital gains (or losses) that are made on state and local government pension fund investments are recorded as revenue. Capital gains in general are extremely volatile and can potentially distort any analysis in which they are not taken into account. The “total insurance trust revenue” subcategory in which pension fund capital gains are recorded, declined catastrophically over the 2008-09 recession. To avoid any potential distortions that pension fund revenues (particularly the capital gains made on pension fund investments), I subtract this subcategory of total revenue out. This means for all the analyses performed in this paper, “total insurance trust revenue” is not a part of “total revenue”. To be consistent, the “total insurance trust expenditures” are also subtracted out from “total expenditure”.

The underlying data used to generate all the tables and figures in this chapter covers the time period of 1954-2015 unless otherwise noted. The underlying data is for the aggregate state and local government sector unless otherwise noted. The data has

been adjusted for inflation by either the GDP Deflator or by dividing by nominal GDP. I indicate in each table which deflating method was used. All data unless otherwise noted is on a per-capita basis.

2.3.2 Time Series Decomposition

2.3.2.1 Preferred Method

The time series decomposition is used to investigate how state and local government spending has behaved over recessions and recoveries since 1954. The methodology described here only applies to the key result Tables 2.1, 2.2, and 2.3

The conceptual idea is to take the time series for total spending and decompose it into a long-run trend and a cyclical component. The correlation between the cyclical component of total spending and the cyclical component of personal income will yield a numerical value between -1 and 1. If the value of the correlation coefficient is more than 0, then it is pro-cyclical, meaning when personal income decreases, total spending would also decrease. I carry out this analysis for total spending and all of its subcomponents, and total revenue and all of its subcomponents. The results are then collected into tables which show the cyclical orientation (pro-cyclical or countercyclical) for each budget component.

The concrete steps taken to produce Tables 2.1 and 2.2 (underlying data is of the state-local government sector as a whole from 1954-2015), and Table 2.3 (underlying data is panel data of each U.S. state from 1961-2015) were:

1. Divide all nominal budget components by GDP deflator and population
2. Take natural log of all real, per-capita budget components
3. Create long-run trend of each budget component by regressing the logged, real, per-capita budget component on time

4. Create the deviation from long-run trend by subtracting the actual logged, real, per-capita budget component value from the long-run trend
5. Difference the deviation from long-run trend
6. Repeat steps 1-5 for nominal personal income
7. Compute the correlation between personal income (in terms of differenced deviation) and each one of the budget components (in terms of differenced deviation)

For Tables 2.1, 2.2, and 2.3, if the correlation coefficient is less than 0 it is classified as countercyclical. If the correlation coefficient is between 0 and 0.1 it is classified as weakly pro-cyclical. If the correlation coefficient is greater than 0.1, it is classified as pro-cyclical.

2.3.2.2 Alternative Trending Methods

There are several methods of obtaining the cyclical component of a time series: polynomial time trends, differencing, autoregressive and moving averages, and various filters. Two alternative methods of de-trending were explored to make sure the results were robust. The first alternative detrending method was linearly detrending the time series of the logged budget components. In other words, it is the same process described above but skips step 5. The second alternative detrending method was applying an HP filter to smooth out the time series of each budget component.

Linearly detrending the time series of each budget component would entail carrying out steps 1-4, 6, and 7 listed above. The main advantage of this detrending process is that it is simple to understand and visual what is actually happening. The reason I chose to ultimately not utilize this method for the main analysis of this paper is because of the extraordinary deviations from long-run trends that occurred in the 2008-09 recession. Both personal income and several of the budget components of state and local

governments deviated substantially starting in 2008-2009 and continuing into 2015. It is possible that this could overstate the true pro-cyclicality of several of the budget components. It is certainly justifiable to argue that this period is not a defect of the trending method – it simply demonstrates the reality of a substantial deviation of personal income and various budget components from their long-run trends. However, the correlation coefficients are less intuitive. If I used the same criteria described above to classify budget components as pro-cyclical, weakly pro-cyclical, or countercyclical, virtually none of them would be classified as countercyclical and very few would be weakly pro-cyclical. I would have to choose more arbitrary and less intuitive classification cut-off points. For this reason, I chose to difference the deviation from log trend. Additionally, I compare my preferred method of detrending to a standard/popular method of detrending: the Hodrick-Prescott (HP) filter.

Although the three different measures produced slightly different absolute correlation coefficients, the relative cyclical orientations were almost identical. This means across these three types of detrending methods, the ranking of budget variables from strongly pro-cyclical to strongly countercyclical were very similar.

The main benefits of using the differenced deviation method described above are that 1) it is easily understood; 2) it does not skew the results towards pro-cyclicality and; 3) does not rely on potentially sensitive parameters.

2.3.2.3 Alternative Business Cycle Measures

The output gap is defined in this paper as the deviation of personal income from its long-run trend. The method used to extract the cyclical component is the first

differencing of the deviation described above. The main benefits of using personal income is that there is a consistent time series for both the state-local government sector and for each individual state. However, there are other possible way to define an output gap. To ensure that the results reported in Section 2.5 are not sensitive to the selection of personal income as the output gap measure, I test two other measures.

The output gap is traditionally measured by the deviation of actual GDP from potential GDP. This would be the preferred measure if potential GDP were available for each state. Unfortunately, state-level potential GDP does not exist. Furthermore, state-level GDP is only available on a consistent basis from 1997.⁴

The cyclical component of employment is another possible way to define the output gap. This measure might make the most logical sense if a recession is not defined by loss of output, but by the loss of employment. Data is available for employment on a national and state-level basis, making this analysis feasible. However, since personal income is a more direct measure of the loss of revenue associated with loss of employment, I chose to use personal income.

Perhaps the most standard way to identify recessions and business cycles is through the National Bureau of Economics Research (NBER). The NBER dates business cycles using a variety of indicators. However, this is not useful for the purposes of this chapter because a cyclical component of a time series is needed to compute a correlation coefficient. Furthermore, the NBER's business cycle dating is conducted on a quarterly basis whereas the Census of Governments data is conducted on an annual basis.

⁴ The BEA advises against appending the historical state-level GDP series with the more updated estimates.

2.3.3 Covariance Analysis

The covariance analysis is used to address the question of what drives state-local spending behavior. This applies to Tables 2.4 – 2.6 in the Results section. To address this question, it would be standard practice to set up a theoretical model of total spending like many others have done, build an empirical model from it, and observe the effects of all of our variables of interest on total spending. However, as Gelman and Imbens (2013) explain, “the literature on causality is more focused on the ‘effects of causes’ than the ‘causes of effects’ ” (p. 1). This means economic analysis usually approaches empirical questions with a pre-determined set of causes and seeks to understand the extent of their effects. For example, econometric models have already specified the causes. This happens when the independent variable set is chosen. But instead of picking and choosing our preferred set of causes, when it is possible, we should look at the entire set of causes and attempt to understand which specific components are driving the overall behavior.

In this vein, it may be better to use a tool such as an accounting identity where all the change in total spending has to be accounted for among the other variables. Following Page-Hoongrajok, Jayadev and Mason (2018), I utilize a covariance matrix for this purpose. Because the variables are related to each other through an accounting identity, the variance of capital spending will be equal to the sum of its covariance with each of the other variables.

The underlying data in Tables 2.4 – 2.6 are a time series of 1954-2015 of the aggregate sector of state and local governments. The concrete steps taken to calculate this set of tables is as follows:

1. Divide all nominal variables by nominal GDP
2. Difference the variables

3. Calculate covariance between total expenditures and subcategories of total expenditure

2.4 Basic Contours of State-Local Government Budgets

State and local governments spend vast amounts of money to provide vital public services and goods. This section will outline the basic composition of state and local government spending and revenue. The purpose of this section is to identify any important aspects of state and local government budgets that need to be taken into account when computing the key results. Furthermore, gaining familiarity with the structure of state and local government budgets, both as a sector and separately, will be useful in the interpretation of the key results.

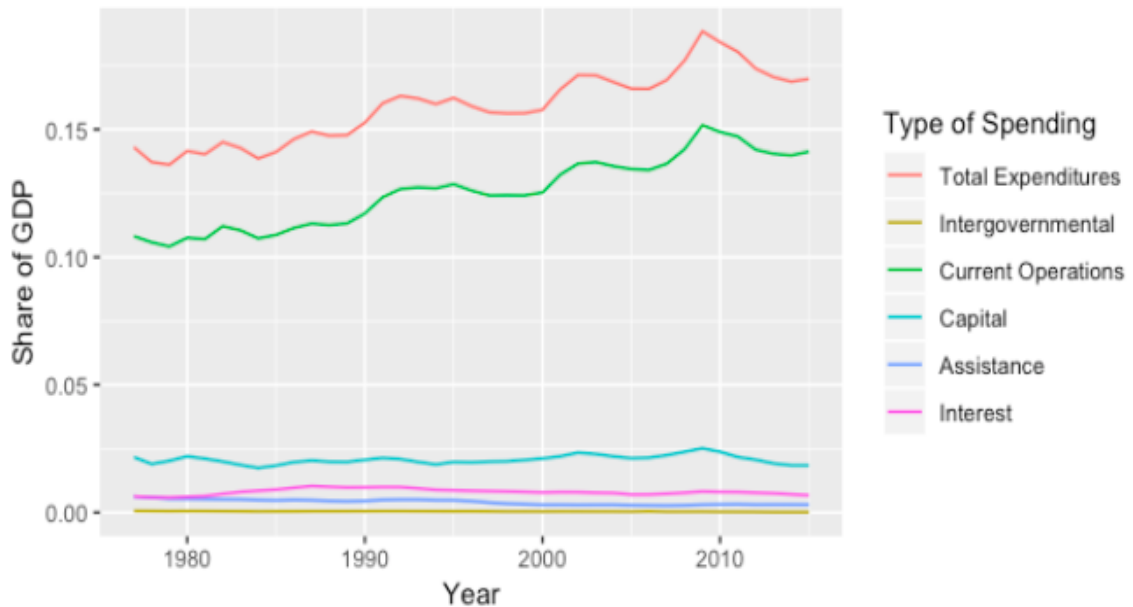
First, I examine the budget components for state and local governments as an aggregate sector. I discuss the magnitude of spending as a share of GDP, the composition of total spending, revenues as a share of GDP, and the composition of total revenues. Then, I outline the key differences between state government budgets and local government budgets. I go on to discuss how state-local government expenditure and revenue has behaved over time. Finally, I provide a brief summary of the main findings from this section.

2.4.1 The Aggregate State and Local Government Budget

State and local government spending in aggregate, was about 14% of U.S. GDP in the mid 1980s, hovered around 16% between 1990 and 2000, and grew to almost 20% of GDP in 2009. Total spending can be divided into five distinct types: current operations, capital outlays, assistance and subsidies, interest on debt, and intergovernmental

expenditures. Current operation spending is by far the largest subcategory of total expenditures. Current operation spending was about 10% of GDP in 1977 and grew to about 15% of GDP in 2009. The remaining subtypes of spending were all less than 2.5% of GDP.

Figure 2.1: Aggregate State-Local Government Spending by Type as Share of GDP, 1977-2015



Source: Census of Governments

As a share of total expenditures, current operation spending represents about 75% of total aggregate state-local government spending. Current operation spending mainly consists of compensation for public employees but also supplies, materials, and operating leases. Capital outlays consist of spending on construction of buildings, roads, purchases of equipment, land, existing structures, and for payments on capital leases. It also includes spending on additions, replacements, and major alterations to fixed works and structures. Capital spending composes about 10% of overall state-local government spending. Total interest on debt is the total amount of interest expenditure on all

outstanding debt and composes about 3.5% of overall expenditures. Total assistance and subsidy spending consist of cash payments to public welfare recipients and composes about 1.5% of overall spending. Intergovernmental expenditures are amounts paid to other governments as fiscal aid. This type of spending is relatively minimal.

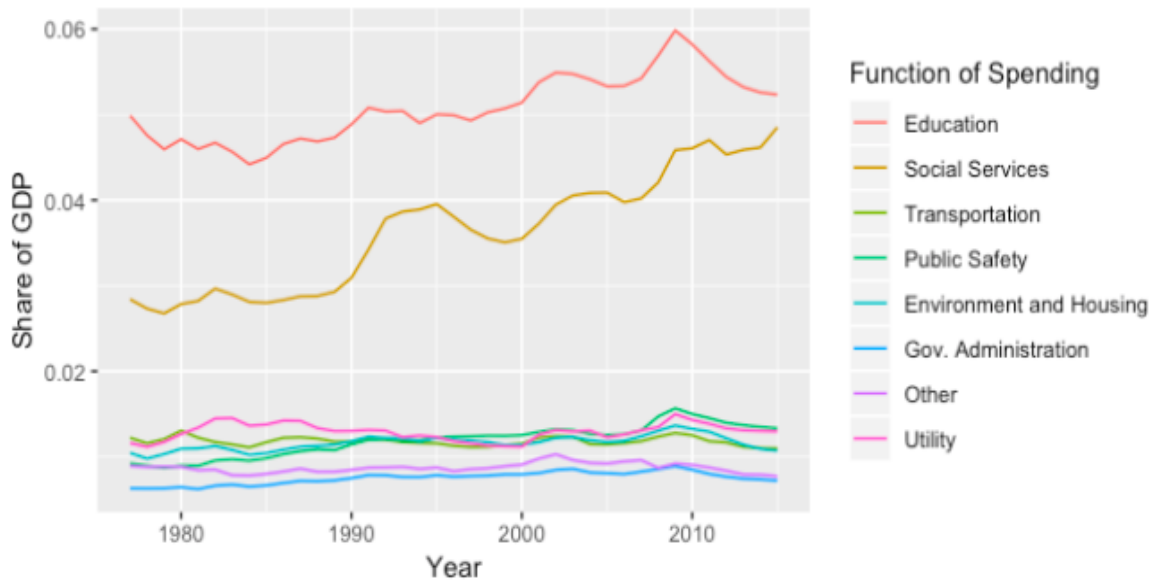
State-local government spending in aggregate can also be decomposed by function of spending. There are eight major functions of spending: total education (elementary and higher education) and libraries, social assistance (public welfare, hospitals, and healthcare), transportation (highways, air, parking, and water), public safety (police, fire, and corrections), environment and housing (natural resources, parks and recreation, housing, sewerage, and solid waste management), government administration, utilities, and other. Education spending and social service spending are by far the largest functional categories of aggregate state-local government sector's overall spending. In 2015, education and social assistance spending were about 10% of GDP. All other functional categories of spending were about 1% of GDP from 1977-2015.

As a share of total expenditures, education spending is about 30%. Followed by social service spending which has grown to about 30% of overall spending. Utility spending has ranged from 7% to 8% of total spending. Transportation, public safety, and environment and housing spending have all ranged between 6% and 8% of total spending throughout 1977-2015. "Other" spending has ranged from 4%-6%. Government administration has been about 4% of overall spending.

The aggregate state-local government sector's revenue has grown from about 16% of GDP in 1980 to about 20% of GDP in 2015. Total revenues are comprised of own-source revenues, federal transfers, and utility revenue. Own-source revenues include total

taxes and charges and miscellaneous revenue. Total taxes include property tax, sales tax, individual income tax, and corporate income tax. Growing from 2% of GDP in 1977 to above 4% of GDP in 2009, charges and miscellaneous revenues is the largest subcomponent of overall revenues for the state and local government sector as a whole. Sales tax has been consistently around 3% of GDP from 1977-2015. Intergovernmental transfers jumped from about 3% of GDP in 2000 to over 4% of GDP in 2010. Property tax has ranged from 2.5% to 3% between 1977 and 2015. Individual income tax has been about 2% of GDP since 2000. Other taxes, utility revenues, and corporate income taxes have all been 1% of GDP or less from 1977-2015.

Figure 2.2: Aggregate State-Local Government Spending by Function as Share of GDP, 1977-2015



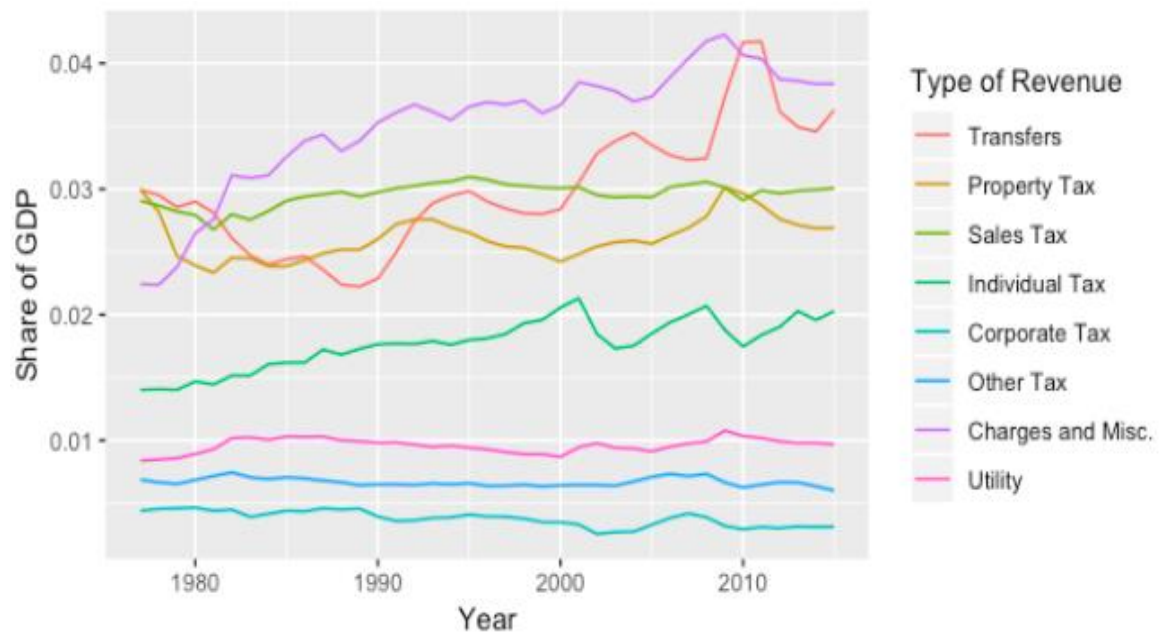
Source: Census of Governments

As a share of total revenue, total taxes have fallen from 60% in 1977 to about 50% in 2015. Property tax and sales tax have roughly fallen from about 20% to 15% during the same period. Individual income tax has remained relatively stable at 11% of total revenues for the state-local government sector. Other taxes has also remained

relatively stable at 4% of overall revenues. Corporate income tax has fallen from about 3% in 1977 to 1% in 2015. Intergovernmental revenues has been about 20% of overall state-local government sector revenue. Charges and miscellaneous revenues has increased from 15% of total revenue in 1977 to 22% of overall revenues in 2015. Utility revenue has remained stable at about 5% of total state-local government sector revenues.

Analyzing state and local governments as an aggregated sector may potentially hide some important differences between state governments and local governments. In the next section I disaggregate the state and local government sector into two different groups 1) the aggregate sector of state governments and 2) the aggregate sector of local governments. This breakdown will allow us to observe the types of spending and revenues that are relatively more important for state governments versus local governments.

Figure 2.3: Aggregate State-Local Government Revenue by Type as Share of GDP, 1977-2015

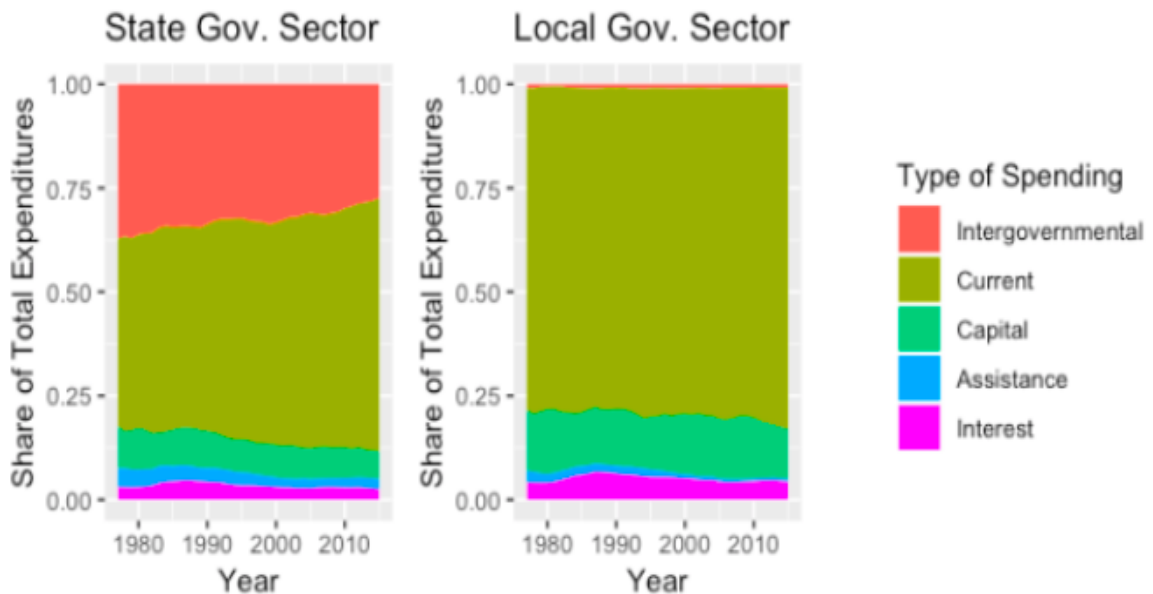


Source: Census of Governments

2.4.2 State Government Budgets and Local Government Budgets

State government budgets are structured differently from local government budgets. This is true both in terms of spending and revenue. Figure 2.4 shows for state governments, intergovernmental transfers to their local governments and social assistance comprises a larger share of their overall expenditures. Local governments spend disproportionately more on capital investment, elementary education, utilities, and public safety.

Figure 2.4: Types of Spending as a Share of Total Spending, 1977-2015

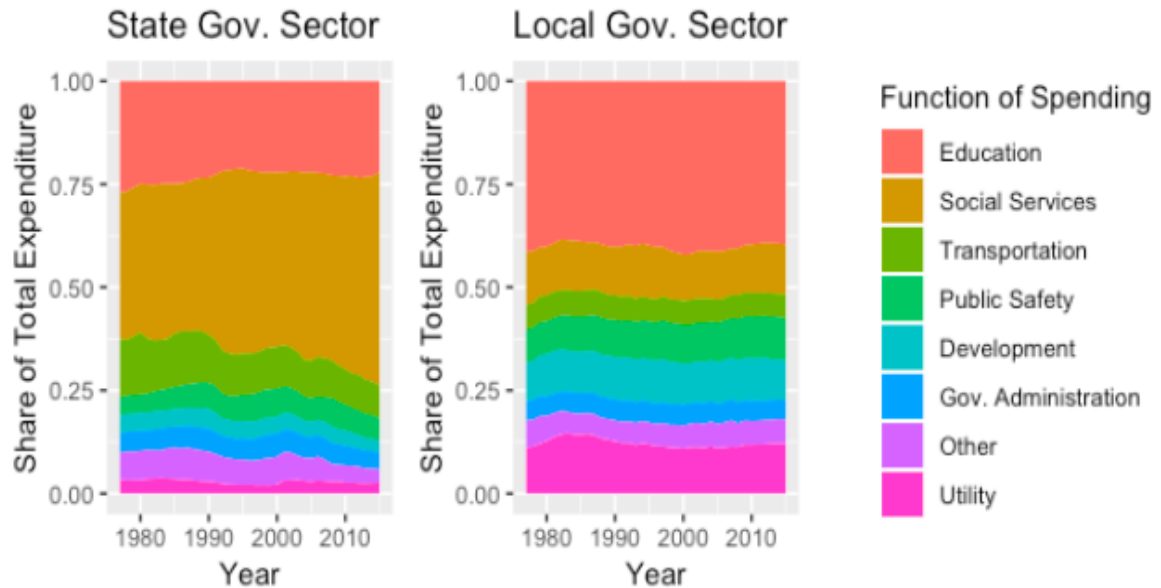


Source: Census of Governments

Figures 2.4 and 2.5 clearly demonstrate the contours of state government and local government budgets. State governments are primarily responsible for the social safety net – things like welfare payments and unemployment compensation. Local governments, on the other hand, are responsible for the administration and delivery of day-to-day services like elementary education, public safety, and utilities. Local

governments also conduct the bulk of public investment. This is consistent with more of their budget being dedicated to paying interest on debt.

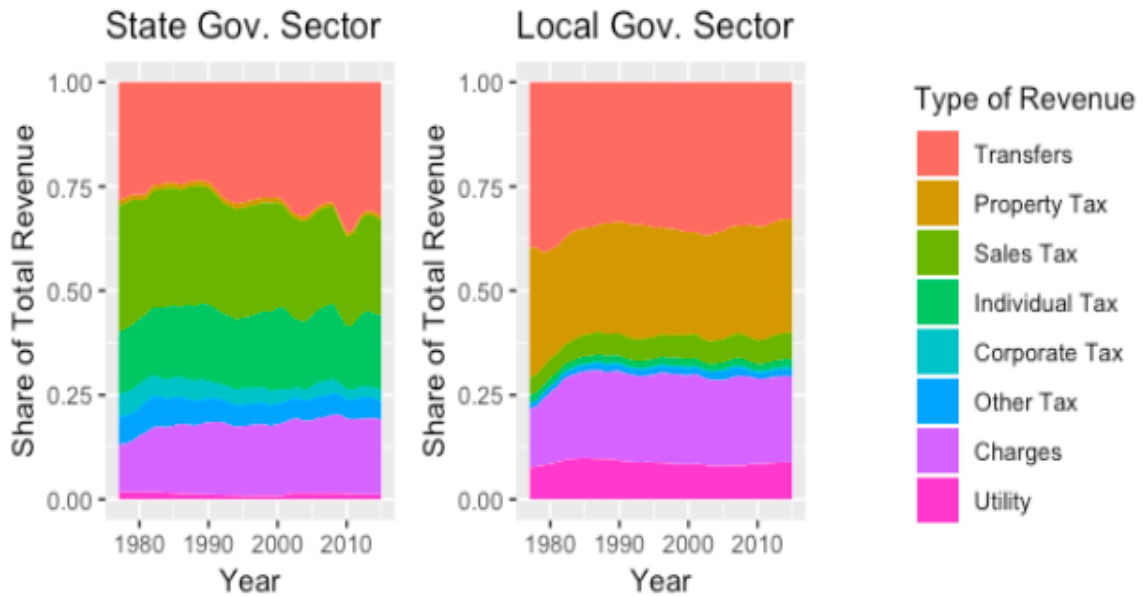
Figure 2.5: Functions of Spending as a Share of Total Spending, 1977-2015



Source: Census of Governments

Figure 2.6 shows the respective revenue streams for state governments and local governments. Both state and local governments depend on transfers – state governments receive federal government transfers and local governments receive transfers from state governments. State governments in aggregate rely mostly on sales tax, individual income tax, and charges. While state government revenue streams are diverse, local government revenue streams are more concentrated. Local governments rely primarily on property taxes and charges. Local governments also rely disproportionately more on revenue from utilities. Neither state governments or local governments seem to rely heavily on corporate income tax revenue. Other taxes seems more important on the state level versus the local level.

Figure 2.6: Type of Revenue as a Share of Total Revenue, 1977-2015

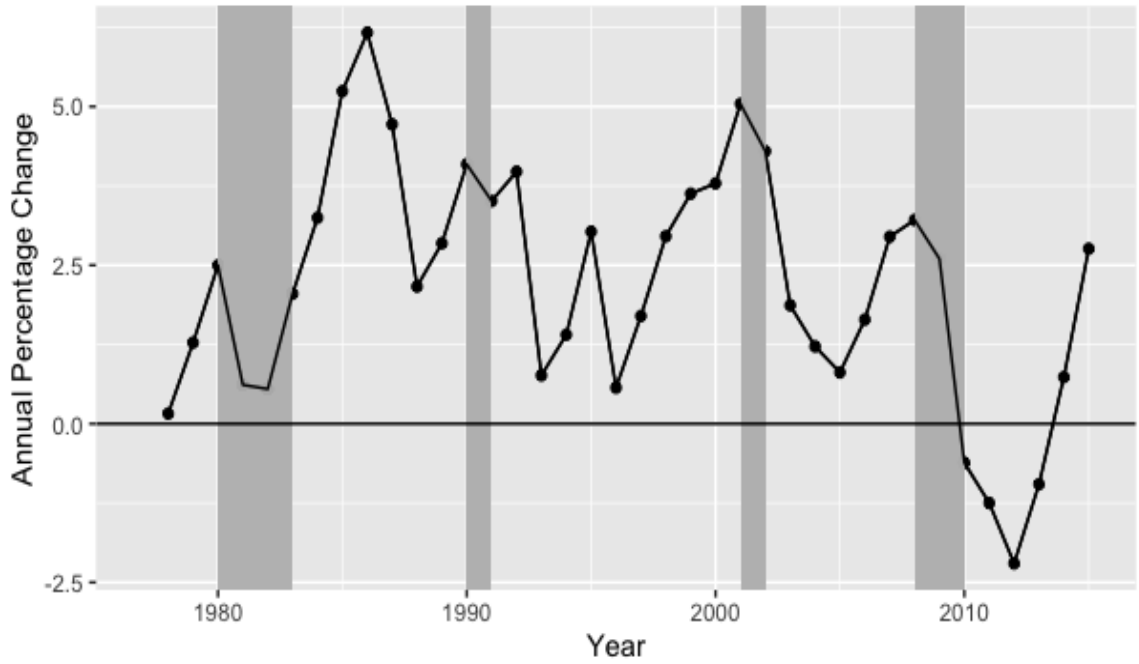


Source: Census of Governments

2.4.3 State-Local Government Sector Budget over Time

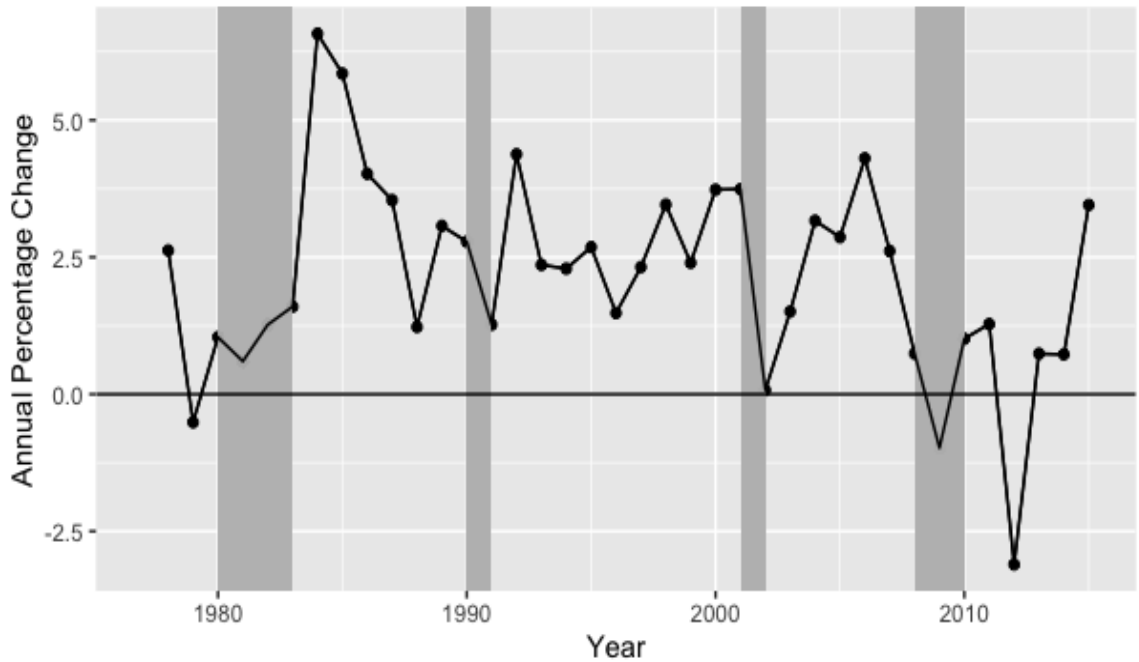
Figure 2.7 shows state-local government real, per-capita spending from 1978-2015 in terms of annual percentage change. Clearly, the last recession and recovery were significantly different than prior business cycles. State-local total expenditures had four years of consecutive negative growth. The magnitude and duration of the state and local government spending cuts are unprecedented. Figure 2.8 shows state-local government real, per-capita spending from 1978-2015 in terms of annual percentage change. State-local total revenues declined 2.5% in 2012 as Figure 2.8 demonstrates. Unlike total spending, total revenues returned to positive growth after 2012. The fact that expenditure growth lagged behind revenue growth for several years is further evidence that the behavior of expenditures is not one-for-one explained by the behavior of total revenue and that balanced budget rules are not completely binding.

Figure 2.7: Aggregate State-Local Government Real Total Expenditures per-capita, 1978-2015



Source: Census of Governments

Figure 2.8: Aggregate State-Local Government Real Total Revenues per-capita, 1978-2015



Source: Census of Governments

2.4.4 Key Observations

The most important types of spending depend on the type of government. As a sector, the largest categories of spending for state and local governments are education and social services. State governments spend primarily on intergovernmental transfers to local governments and social assistance whereas local governments spend primarily on elementary education and public investment, followed by public safety and utilities. State government revenue relies on federal government transfers, sales taxes, and individual income taxes. Local government revenue relies on state transfers, property taxes, and charges.

The recovery from the last recession has been uncharacteristically slow. Unlike previous recoveries, spending for the state-local aggregate sector has not increased. Both in terms of change in the share of GDP and in terms of annual percentage change, total spending has actually declined during the recovery as Figure 2.7 shows. An in-depth exploration of this issue is beyond the scope of this chapter but is pursued at length in Chapter 4.

2.5 Results

The two central questions of this chapter are 1) how does state-local government spending behave over historical business cycles? and 2) what components of spending drive that behavior? This section answers these questions. First, I show how the different components of spending behave over historical recessions and recoveries by computing the correlation between the cyclical component of personal income and the cyclical component of each type of spending. I conduct this analysis for both state and local

governments in aggregate and also across states. I then utilize a covariance matrix to identify where the variation in overall spending comes from.

2.5.1 State-Local Government Budget Behavior over Business Cycles

How do the major components of state and local government budgets behave over the business cycle? State and local governments comprise a large aggregate sector of the economy. As such, I first look at the how the budget components for the aggregate state-local government sector have behaved over previous recessions and recoveries.

2.5.1.1 The Aggregate State-Local Government Sector

Table 2.1 classifies each type of state-local government sector spending as procyclical, weakly procyclical, or countercyclical. The classification depends on the value of the correlation coefficient between the type of spending's cyclical component and the cyclical component of national personal income. The concrete steps taken to create Table 2.1 and Table 2.2 were outlined in the methodology section.

Again, for Tables 2.1, 2.2, and 2.3, if the correlation coefficient is less than 0 it is classified as countercyclical. If the correlation coefficient is between 0 and 0.1 it is classified as weakly procyclical. If the correlation coefficient is greater than 0.1, it is classified as procyclical.

Table 2.1 shows that aggregate state-local government sector's spending is procyclical. This means as output decreases during a recession, overall state and local spending also decreases. Total spending can be decomposed into current spending (spending on wages, supplies, and other current expenses) and capital spending

(investment, infrastructure projects). Current expenditures are more pro-cyclical than overall expenditures. This finding is consistent with public employee layoffs during recessions.

Table 2.1: Aggregate State-Local Government Sector Correlation between Spending and National Personal Income, 1954-2015

Type of Spending	Correlation with Personal Income	Cyclicity
Total Expenditures	0.13	pro-cyclical
Current Expenditures	0.15	pro-cyclical
Capital Outlays	0.03	weakly pro-cyclical
Assistance and Subsidies	-0.38	countercyclical
Total Education	0.22	pro-cyclical
Higher Education	0.17	pro-cyclical
Elementary Education	0.21	pro-cyclical
Hospitals and Health	-0.34	countercyclical
Highways	0.09	weakly pro-cyclical
Public Safety	0.16	pro-cyclical
Environment, Housing, and Sanitation	0.04	weakly pro-cyclical
Utilities	-0.07	countercyclical

Source: Census of Governments, author's analysis. Correlation between differenced deviation from linear trend of logged real, per-capita spending and differenced deviation from linear trend of logged real, per-capita national personal income. Correlation coefficient > 0.10 , pro-cyclical; correlation < 0.10 but > 0 , weakly pro-cyclical; correlation < 0 , countercyclical.

Table 2.1 shows that aggregate state-local government sector's spending is pro-cyclical. This means as output decreases during a recession, overall state and local spending also decreases. Total spending can be decomposed into current spending (spending on wages, supplies, and other current expenses) and capital spending (investment, infrastructure projects). Current expenditures are more pro-cyclical than

overall expenditures. This finding is consistent with public employee layoffs during recessions.

Capital spending is weakly pro-cyclical. This finding is very interesting and important since there are theoretical and practical reasons to believe capital spending will behave strongly pro-cyclically or countercyclically, but not weakly pro-cyclically. Capital spending could potentially be strongly pro-cyclical if funds for capital spending are diverted to help prop up current expenses. It is reasonable to believe that governments might engage in this behavior by prioritizing current expenses over investment projects. In other words, when faced with firing public employees or building a new library, governments might opt to stop all capital spending in order to preserve jobs for the existing public workers. If state and local governments acted like this, capital spending would be highly pro-cyclical.⁵ During a recession, all capital spending would be halted and the funds would be used to prop up current spending to keep people employed. On the other side of the spectrum, there are theoretical arguments for why capital spending should behave countercyclically. Keynes argued that capital spending should increase during recessions to stimulate the economy. He argued that speeding up or delaying an investment project would be less disruptive to citizens than cuts in state-issued benefits. However, what my analysis shows is that capital spending is not highly pro-cyclical or countercyclical. I return to this point at length in Chapter 3.

Table 2.1 also reports the cyclicity for total spending by function. Education spending is highly pro-cyclical. The correlation of total education spending with national

⁵ This is only true if the funds used for capital spending can be legally and effectively be used for current expenditure purposes. This question is explored further in Chapter 3.

personal income is 0.22, the largest correlation coefficient among all types of spending. This means when output decreases during a recession, education spending is going to decrease the most out of any type of spending. Total education spending consists of higher education which is primarily state government spending on public universities and elementary education which is primarily state and local government spending on kindergarten through twelfth grade. Both higher education spending and elementary education spending are highly pro-cyclical with correlation coefficients greater than the correlation coefficient of total expenditure. Elementary education spending is the most pro-cyclical subcomponent of all spending types with a correlation coefficient of 0.21. This finding is consistent with layoffs of K-12 public school teachers during recessions. To a lesser extent, the same trends apply to public safety workers such as police officers, fire fighters, and corrections officers. State and local government spending for these categories is pro-cyclical, with a correlation coefficient of 0.16, it is more pro-cyclical than overall expenditures. Highway spending is weakly pro-cyclical. With a correlation coefficient of 0.09, it is much less pro-cyclical than overall expenditures. This is likely to the nature of highway spending. State governments conduct the bulk of highway transportation spending which consists of the construction, maintenance, and operations of the highways, streets, and other structures like toll highways, bridges, tunnels, ferries, street lighting, and snow removal. This means that highway spending is mostly for investment projects and mirrors the behavior of capital spending which is much less pro-cyclical than other types of spending.

The countercyclical types of spending are assistance and subsidies, hospitals and health, utilities, and social insurance payments. Assistance and subsidies consist of cash

contributions and subsidies to citizens, for example public welfare payments, veteran's bonuses, or grants for tuition. This type of spending increases during a recession as output goes down. This is likely due to mandatory spending increases that force state and local governments to increase these types of social assistance payments during economic downturns. Health and hospital spending behave countercyclically for similar reasons. Utility spending consists of expenditure for construction of utility facilities or equipment, for production and distribution of utility commodities and services. Utility expenditures also behave countercyclically. This is likely due to the stability of the financing source – utility revenue. During a recession, heating and electrical usage is not cut back on in sizable amount, meaning utility revenue is somewhat stable over economic downturns. This, in turn, allows utility expenditures to behave countercyclically. Environment, housing, sanitation, and sewage spending is a mixture of spending on natural resources, housing, parks and recreation, sanitation, and solid waste management expenses. Although this has a weakly pro-cyclical correlation coefficient of 0.04, the cyclical orientation of the various components is likely to be mixed. For example, the natural resource and parks and recreation component is likely to be pro-cyclical, for spending to be cut back as output decreases. Housing spending consists mainly of construction and revocation projects which likely mirrors the countercyclical orientation of capital spending. Sewerage and sanitation spending operate more similarly to utility spending since the need for these services is stable during economic downturns.

Table 2.2 presents the cyclical orientation of total revenue and all of its components. Total revenue is pro-cyclical, meaning as output decreases during a recession, total revenues for the state-local government sector decrease. Total revenue

can be decomposed into general revenues from own sources, federal government transfers, and utility revenues. State and local government's general revenues from own sources are revenues that come from all taxes, charges, and miscellaneous sources.

Table 2.2: Aggregate State-Local Government Sector Correlation between Revenue and National Personal Income, 1954-2015

Type of Revenue	Correlation with Personal Income	Cyclicity
Total Revenue	0.54	pro-cyclical
General Revenues from Own Sources	0.62	pro-cyclical
Federal Transfers	0.05	weakly pro-cyclical
Total Taxes	0.63	pro-cyclical
Property Taxes	0.06	weakly pro-cyclical
Sales Tax	0.66	pro-cyclical
Individual Income Tax	0.64	pro-cyclical
Corporate Income Tax	0.53	pro-cyclical
Charges and Misc. Rev	0.31	pro-cyclical
General Charges	0.06	weakly pro-cyclical
Misc. Revenue	0.38	pro-cyclical
Utility Revenue	0.04	weakly pro-cyclical

Source: Census of Governments, author's analysis. Correlation between differenced deviation from linear trend of logged real, per-capita revenue and differenced deviation from linear trend of logged real, per-capita national personal income. Correlation coefficient > 0.10 , pro-cyclical; correlation < 0.10 but > 0 , weakly pro-cyclical; correlation < 0 , countercyclical.

General revenues from own sources are more pro-cyclical than overall spending with a correlation coefficient of 0.62. Federal transfers have a correlation coefficient of 0.05 are much less pro-cyclical than overall revenues. A likely explanation for this is that as recessions occur, the federal government transfers large amount of stimulus funds to state and local governments. In other words, as output decreases, federal transfers

increase. Utility revenue is revenue that comes from the sale of utility commodities and services to the public. It is much less pro-cyclical than overall revenues. Similar to utility expenditures, a possible explanation for this is that during recessions, even as output declines, the need for electricity, heat, and other utilities does not fall proportionally with output since those services are highly needed. Thus, even during economic downturns, people will for the most part continue to purchase utility services which provides stable revenue streams.

General revenues from own sources can be decomposed into total taxes, general charges, and miscellaneous revenue. With a correlation coefficient of 0.63, total taxes is the most pro-cyclical of the three subcomponents. Taxes, in general, are more pro-cyclical than overall revenues. Breaking down total taxes into property taxes, sales taxes, individual income taxes, and corporate income taxes, we see that sales tax and individual income taxes are the most pro-cyclical revenue streams in state and local budgets. Their correlation coefficients are 0.66 and 0.65 respectively, meaning they are more pro-cyclical than total taxes. Corporate income tax is not far behind with a correlation coefficient of 0.53. It makes sense for tax revenues to in generally behave pro-cyclically. When incomes of individuals and corporations fall, revenue streams that come from taxing those incomes will fall proportionally. This means as output declines, incomes decline, and thus revenue based on those incomes decline. Property taxes are the one type of tax in state and local budgets that is weakly pro-cyclical. A likely explanation for this is that property values do not usually change during recession, with the last recession being an important exception. During a recession, even as output and incomes fall, if property values do not fall, the tax revenue generated from property values will remain

stable. In the last recession, unlike prior recessions, declining housing and property values were a significant factor in the recession. Even in this case, there is reason to suspect property tax revenue remained stable during the recession. This is because of the lagged nature of property valuation. By the time housing values plummeted and it was reflected in property taxes collected by local governments, the recession had officially ended two years prior. Whereas sales tax revenue and income tax revenue (both individual and corporate) fall immediately when output declines, property tax revenue will decline but with a lag of one or two years, given that property values declined. The second component of general revenues from own sources, miscellaneous revenues, has a correlation coefficient of 0.32 and is also pro-cyclical but to a milder extent than overall revenues.

The third component of general revenues from own sources, general charges, has a correlation coefficient of 0.06 and is much less pro-cyclical than overall revenues and the other components of general revenues from own sources. Charges are amounts received from the public for performance of specific services benefiting the person charged, and from sales of commodities and services. This could include fees, assessments, rents and sales derived from commodities or services furnished. A possible explanation for why this type of revenue is more stable over an economic downturn is similar to the explanation for why utility revenue is more stable during a recession. The need for these types of services do not fall proportionally with output so the revenue generated from these services does not fall proportionally with output. In other words, during recessions, people still go to public universities, use public hospital services, depend on the state or local government for sewer and waste management services. The

use of these services requires users to pay fees which in turn are collected into the charges category of state-local government revenue.

2.5.1.2 Across State Governments

Table 2.3 presents the cyclicity of each budget component using the average correlation coefficient across state governments. The analysis outlined in the methodology section was applied to time series data for each one of the 50 U.S. states. In other words, fifty correlation coefficients (one for each state) were computed for each budget component. Table 2.3 displays the average of these fifty correlation coefficients.

The correlation coefficient again here represents the relationship between the cyclical component of the budget variable and the cyclical component of state personal income. Specifically, it represents the correlation between the differenced deviation from the linear trend of the logged real, per-capita budget variable and the differenced deviation from the linear trend of logged, real, per-capita state personal income. The classification criteria is the same as Tables 2.1 and 2.2. Specifically, if the correlation coefficient is less than 0 it is classified as countercyclical. If the correlation coefficient is between 0 and 0.1 it is classified as weakly pro-cyclical. If the correlation coefficient is greater than 0.1, it is classified as pro-cyclical.

Overall, the main findings from the aggregate analysis are consistent with the cross-state analysis. Total expenditures are pro-cyclical, current expenditures are more pro-cyclical than overall spending, and capital/highway spending is much less pro-cyclical than overall spending. Education and protective services are pro-cyclical while

social assistance spending (assistance and subsidies and health and hospitals) is relatively countercyclical.

Table 2.3: Across State Governments Correlation between Budget Component and State Personal Income, 1961-2015

Budget Component	Average correlation with Personal Income	Cyclicity
Total Expenditures	0.17	pro-cyclical
Current Expenditures	0.19	pro-cyclical
Capital Outlays	0.06	weakly pro-cyclical
Assistance and Subsidies	0.00	countercyclical
Total Education	0.14	pro-cyclical
Health and Hospitals	0.05	weakly pro-cyclical
Highways	0.05	weakly pro-cyclical
Public Safety	0.13	pro-cyclical
Environment, Housing, and Sanitation	0.09	weakly pro-cyclical
Total Revenue	0.38	pro-cyclical
General Revenues from Own Sources	0.43	pro-cyclical
Federal Transfers	0.05	weakly pro-cyclical
Total Taxes	0.45	pro-cyclical
Property Tax	0.00	countercyclical
Individual Income Tax	0.34	pro-cyclical
Corporate Tax	0.25	pro-cyclical
Sales Tax	0.34	pro-cyclical
General Charges	0.01	countercyclical

Source: Census of Governments, author's analysis. Correlation between differenced deviation from linear trend of logged real, per-capita budget component and differenced deviation from linear trend of logged real, per-capita state personal income. Correlation coefficient > 0.10 , pro-cyclical; correlation < 0.10 but > 0 , weakly pro-cyclical; correlation < 0 , countercyclical.

Total revenues are pro-cyclical. The most cyclical component of overall revenues is general revenues from own sources. Federal transfers are relatively countercyclical.

Total taxes are the most pro-cyclical component of general revenue from own sources.

Sales and income tax are the most pro-cyclical tax revenue sources. Property taxes are countercyclical.

2.5.2 Determinants of Aggregate State-Local Government Spending Behavior over Business Cycles

What drives state-local spending behavior over recessions and recoveries? The previous sections have demonstrated *how* state and local government budgets behave during recessions and recoveries. This section investigates *why* the various budget components behave as they do. I first examine how the behavior of overall spending can be explained by the different subcomponents of spending. I then examine how the behavior of overall spending can be explained by the different subcomponents of revenue.

2.5.2.1 Decomposition of Total Spending by Spending Type

The main tool used to address this question is a covariance matrix. Covariance describes how variation between two variables is related. Since covariance is linear, we can decompose total spending's variance into the sum of all of its components.⁶ The first way to decompose total spending is:

$$\text{total spending} = \text{intergovernmental spending} + \text{current operation spending} + \text{capital outlay spending} + \text{assistance and subsidies spending} + \text{interest payments}$$

So, the variance of total spending will equal the sum of the covariance of total spending with all of the subcomponents of total spending:

$$\begin{aligned} \text{Variance}(\text{total spending}) = & \text{covariance}(\text{total spending, intergovernmental}) + \\ & \text{covariance}(\text{total spending, current operation}) + \\ & \text{covariance}(\text{total spending, capital outlay}) + \\ & \text{covariance}(\text{total spending, assistance}) + \\ & \text{covariance}(\text{total spending, interest}) \end{aligned}$$

⁶ $\text{cov}(x, y + z) = \text{cov}(x, y) + \text{cov}(x, z)$

This type of covariance analysis allocates the observed variation in total spending among the different possible sources. In other words, decomposing the variation of total spending into the contributions of variation in each of the other variables will help us understanding why total spending has increased in some years and decreased in others.

Tables 2.4 – 2.6 are generated from a time series of the aggregate state-local government sector from 1954-2015. The concrete steps used to generate these tables are outlined in the methodology section.

Table 2.4: Aggregate State-Local Government Sector Covariance between Types of Spending and Total Expenditures, 1954-2015

Type of Spending	Covariance with Total Expenditures	Share of Total Expenditure Variance
Total Expenditures	0.17	1.00
Current Operations	0.12	0.73
Capital Outlays	0.04	0.21
Assistance and Subsidies	0.00	0.03
Interest	0.01	0.04
Intergovernmental	0.00	0.00

Source: Census of Governments, author's analysis. Covariance between differenced type of spending as share of GDP and differenced total spending as a share of GDP.

Table 2.4 presents the covariance matrix for total spending and its subcomponents. The covariance between current operations and total spending is 0.12 which means about 73% of the variation in total expenditures can be attributed to the variation in current operations. About 21% of the variation in total spending can be attributed to capital spending. Assistance and subsidies and interest can explain about 3% and 4% of total spending respectively. Intergovernmental spending does not explain a significant amount of the variation in overall spending.

Another way to decompose overall spending is:

total spending = total education spending + total social assistance spending + total transportation spending + total public safety spending + total environment, housing, and sanitation spending + government administration spending + other + total utility spending + intergovernmental spending + interest spending

This decomposition, unlike the first one, categorizes spending by function. For example, the contribution of education spending variation to overall spending variation is captured in this decomposition.

Table 2.5 presents the covariance between total expenditures and each type of spending by function. It is generated from a time series of the aggregate state-local government sector from 1954-2015. The concrete steps used to generate this table were outlined in the methodology section.

Table 2.5: Aggregate State-Local Government Sector Covariance between Functions of Spending and Total Expenditures, 1954-2015

Function of Spending	Covariance with Total Expenditures	Share of Total Expenditure Variance
Total Expenditures	0.17	1.00
Education	0.05	0.30
Social Assistance	0.04	0.24
Transportation	0.01	0.07
Public Safety	0.01	0.09
Environment, Housing, Sanitation	0.01	0.09
Government Administration	0.01	0.05
Other	0.00	0.03
Utility	0.01	0.07
Interest	0.01	0.04
Intergovernmental	0.00	0.00

Source: Census of Governments, author's analysis. Covariance between differenced function of spending as share of GDP and differenced total spending as a share of GDP.

Table 2.5 presents the covariance matrix for total spending and each function of spending. About 54% of the variation in overall spending can be attributed to education spending (30%), social assistance spending (24%). Less important drivers of overall expenditure behavior, but still relevant, are public safety spending, environment, housing, and sanitation spending, and transportation spending.

2.5.2.2 Decomposition of Total Spending by Revenue and its Subcomponents

Total spending can also be decomposed in a way that includes revenue. A spending decomposition that includes revenue is of interest if we think that the variation in revenue can potentially explain all or most of the variation in total spending. For example, perhaps the variation in overall spending can be primarily attributed to variation in federal transfers.

If total spending were always equal to total revenue, a straightforward covariance matrix like the ones above could be created. In the cases above total expenditures are always equal to the sum of the different spending components. However, this is not true for total expenditures and total revenue. State and local governments both in aggregate and across state-local governments almost always run deficits or surpluses and very rarely have budgets that are exactly balanced in any given year. For this reason, I create a “fiscal deficit” variable which allows for an exact accounting identity between total expenditures and total revenues:

$$\text{Total spending} = \text{total revenues} + \text{fiscal deficit}$$

$$\text{Total spending} = \text{federal transfers} + \text{general revenues from own sources} + \text{utility revenues} + \text{fiscal deficit}$$

Total spending = federal transfers + total tax revenue + general charges + miscellaneous revenue + utility revenues + fiscal deficit

Total spending = federal transfers + property tax revenue + individual income tax revenue + corporate tax revenue + sales tax revenue + other tax revenue + general charges + miscellaneous revenue + utility revenue + fiscal deficit

Table 2.6 presents the covariance between total expenditures and each type of revenue. It is generated from a time series of the aggregate state-local government sector from 1954-2015. The concrete steps used to generate this table were outlined in the methodology section.

Table 2.6: Aggregate State-Local Government Sector Covariance between Types of Revenue and Total Expenditures, 1954-2015

Type of Revenue	Covariance with Total Expenditures	Share of Total Expenditure Variance
Total Expenditures	0.17	1
Total Revenue	0.09	0.53
Federal Transfers	0.04	0.21
Total Taxes	0.02	0.12
Property Tax	0.03	0.16
Sales Tax	0.00	0.02
Individual Income Tax	-0.01	-0.04
Corporate Income Tax	-0.00	-0.03
Other Taxes	-0.00	-0.00
Charges and Misc. Revenue	0.03	0.16
Charges	0.02	0.10
Miscellaneous Revenue	0.01	0.06
Utility	0.01	0.05
Fiscal Deficit	-0.08	-0.46

Source: Census of Governments, author's analysis. Covariance between differenced type of revenue as share of GDP and differenced total spending as a share of GDP.

Table 2.6 presents the covariance matrix for total spending and revenue (and its subcomponents). About 21% of the variation in overall spending can be attributed to federal transfers. This means federal transfers, out of all the subcomponents of revenue, shares the most variation with total expenditures. About 16% of the variation in total expenditures can be attributed to the variation in property taxes. Income taxes (both individual and corporate) sales tax, and other taxes do not appear to share much variation with total expenditures. The variation in general charges can explain about 10% of the variation in overall spending. Almost half of the overall variation in spending can be explained by the fiscal deficit. This demonstrates a major point made throughout this and other chapters – that the state and local government sector spending is not solely determined by total revenues as the balanced budget rules discussed in Section 2.2 would suggest.

2.5.3 Summary of Main Findings

Capital spending is not strongly pro-cyclical or countercyclical, contrary to theoretical predictions. Capital spending could potentially behave strongly pro-cyclically if governments used capital spending funds for current spending instead. Mandatory spending increases during a recession, intensifying the pressure to cut other types of spending even more. Capital spending is a target for spending cuts since new investment projects can be delayed. This theory implies that during a recession, capital spending should substantially decrease. Keynesian theory, on the other hand, suggests that capital spending should increase during a recession. This is because capital spending would employ workers, provide them with incomes, some of which they will spend to purchase

goods and services. It is puzzling that capital spending exhibits neither the pro-cyclical behavior implied by balanced budget rules nor the countercyclical behavior advocated by Keynesian theory. It is important to ascertain the cyclical orientation of capital spending in order to design successful countercyclical programs. For example, the American Recovery and Reinvestment Act of 2009 relied heavily on transfers to state and local governments for capital projects to counteract the recession. I investigate the behavior of capital spending over the business cycle at length in the next chapter.

Elementary education spending is the main adjustment mechanism in balancing state-local government budgets. Elementary education spending is highly sensitive to decreases in national output. During recessions teachers are laid off, supplies cut back, new investments and repairs are delayed. Laying off public workers is undesirable from both an economic and moral point of view. Laying off workers decreases aggregate incomes. This exacerbates recessions by decreasing the amount of aggregate spending and tax revenue. Morally, these types of cutbacks can severely impact the quality of public education. Adequately funded public schools not only provide children with intellectual and social enrichment, they also build foundations for economic mobility. These goals simply cannot be achieved while elementary school spending is the primary adjustment mechanism to balance state-local budgets. My findings suggest that local governments should be given adequate transfers to stabilize elementary education funding during recessions.

Federal transfers and property taxes drive state-local spending behavior. The variation in federal transfers and property tax revenue accounts for about 37% of total variation in overall expenditures. This is critical in explaining why total expenditures are

less pro-cyclical than total revenues. Federal transfers and property tax revenue are the most stable revenue sources, thus if a significant amount of spending is funded by those sources, overall spending will be more stable than overall revenue. This finding also suggests that federal transfers can be a significant stabilizing source for state-local spending over the business cycle.

2.6 Conclusion

The purpose of the paper is to investigate how the components of state-local government budgets have behaved over historical business cycles. This is motivated by the fact that significant pro-cyclical spending by the state-local government sector could neutralize federal government stimulus attempts. To assess the severity of this issue, two central questions must first be answered: 1) how has state-local government spending behaved in the past during recessions and recoveries and; 2) what specific components of overall spending drive this behavior?

I utilized two distinct methodologies to address these questions. To investigate how state-local government budgets have behaved over historical business cycles, I decomposed spending (and all of its subcomponents) into long-run trends and cyclical deviations. I then computed the correlation between the cyclical deviation of each spending stream and the output gap. This allowed me to classify each type of spending and revenue as either pro-cyclical, countercyclical or neutral. To investigate what specific components drove the behavior of overall spending, I computed a covariance matrix between total spending and all of its subcomponents. The variation of overall spending can be decomposed into its covariances of all of its subcomponents. The covariance

matrix effectively shows which subcomponents share the most variation with overall spending.

This paper has many important conclusions for the use of countercyclical spending at the state and local government level. First, I find that capital spending is weakly pro-cyclical and significantly less pro-cyclical than current operation spending. This means that during recessions, capital spending is much less likely to decrease than spending for current expenditures. This result indicates that capital spending is potentially the best candidate for countercyclical spending purposes. Chapter 3 provides an in-depth investigation on the feasibility of utilizing capital spending to help stimulate local economies.

Second, I find that education spending, particularly elementary school spending is the most pro-cyclical component of state and local government budgets. This means that education funds are cut significantly during recessions. Clearly, education spending has little potential to act as a countercyclical stimulus, if historical behavior persists. The implications for this finding suggest that the federal government will need to transfers a substantial amount of funds to state and local governments just to keep education spending stable during a downturn.

Third, federal government transfers and property taxes can explain about 36% of the variation in overall state-local spending. This result suggests that the variation in federal transfers and property taxes over time are critical factors to understand the variation in total expenditures over time.

Lastly, the basic description of the state and local government aggregate sector's budget over time showed that expenditures had decreased substantially during the 2010

recovery. The decrease in expenditure growth during this period was unprecedented. Furthermore, the basic data show that revenue growth had recovered much faster than expenditure growth. Specifically, revenue growth was negative for only one year in the 2010 recovery vs. four consecutive years of negative expenditure growth. If declines in revenue growth were (at first glance) not the major reason for the decline in expenditure growth during the most recent recovery, what was? This question is explored further in Chapter 4 of this dissertation.

The analysis above yields some important implications for state-local government fiscal policy. The investigation of how the major components of state and local government budgets behave over the business cycle identified which spending and revenue streams were pro-cyclical and countercyclical. This information can be utilized to assess state and local government's ability to act as countercyclical agents.

CHAPTER 3

ASSESSING STATE AND LOCAL GOVERNMENT INVESTMENTS AS A COUNTERCYCLICAL TOOL: WHAT WE CAN LEARN FROM INTERVIEWS WITH POLICYMAKERS

3.1 Introduction

This paper examines the role of state and local government spending in terms of their impact on business cycles in the United States. There are two basic reasons for addressing this question. First, the sheer size of the state-local government sector implies that fluctuations in its spending will have significant impacts on the macroeconomy. Second, state and local governments were featured centrally in the federal stimulus effort following the 2007-2009 Great Recession.

State and local governments account for the majority of public spending in the United States. They administer and manage essential services such as education, healthcare, and transportation. To this end, state and local governments hire public workers, invest in infrastructure, and purchase materials and equipment. This spending contributes substantially to the economy. As of 2016, total federal government spending was 23% of U.S. GDP, whereas state and local government total spending was 14% of GDP. However, the relative sizes of the federal government and state-local government sector reverse when transfer payments such as social security and interest payments are subtracted from overall spending levels. Since 1970, state and local government consumption and investment has remained near 12% of GDP. Federal consumption and investment, on the other hand, has declined from 12% of GDP in 1970 to roughly 7% of

GDP in 2016. When it comes to capital spending, the distribution is even more dramatic.⁷ State and local governments conduct over 75% of public total nondefense capital spending (Federal Reserve Economic Data, 2018a-b).

The American Recovery and Reinvestment Act (ARRA) of 2009 sought to use state and local governments as conduits for countercyclical spending. A major goal of the ARRA was to accelerate investment spending via “shovel-ready” projects – projects that were ready for construction at the time the stimulus program was enacted (Furman, 2018, p.16). In December 2008, President Obama popularized the term “shovel-ready” projects to describe how the ARRA will increase state and local government spending and create jobs. There were over 4,000 news stories on shovel-ready projects between November 2008 and March 2009 (Jones and Rothschild, 2011). Obama (2008) stated:

Well, I think we can get a lot of work done fast. When I met with the governors, all of them have projects that are shovel-ready, that are going to require us to get the money out the door, but they've already lined up the projects and they can make them work. And now, we're going to have to prioritize it and do it not in the old traditional politics first wave. What we need to do is examine what are the projects where we're going to get the most bang for the buck, how are we going to make sure taxpayers are protected.

The purpose of this paper is to investigate the question: can state and local government capital spending be effectively mobilized to serve as a countercyclical tool in the overall macroeconomic policy toolkit? State and local governments operate distinctly from the federal government and some of these differences may limit their ability to leverage capital spending as a countercyclical policy tool. The potential barriers may be

⁷ Capital spending is defined as direct expenditure for the construction or maintenance of public infrastructure, including equipment and purchases of land.

constitutional in nature or be derived from the practical reality of the typical capital investment decision making process at the state and local levels.

I draw on both qualitative and quantitative research methods to investigate these issues. Qualitative research methods are defined by their unstructured, open-ended character of data collection. First, I conducted open-ended interviews with budget officials from state and local governments across the United States. Then, after synthesizing the information learned from the interviews, I administered a short questionnaire to all fifty state governments budget offices and fifteen large city governments.

Qualitative research methods are rarely used in economic research. I choose to implement these methods for two primary reasons. First and most importantly, open-ended interviews allow us to learn new things. There may be important capital spending determinants that the previous researchers, including myself, have not considered. Budget practitioners may identify or highlight factors that are important for state-local government capital spending in practice that are not included in existing theories or models. Such insights can contribute to our current understanding of capital spending behavior over the business cycle. Second, there already exists an abundance of econometric studies on state-local capital spending.⁸

I find that at present, there are significant barriers preventing state-local capital spending from being effectively employed as a countercyclical tool. First, state and local government capital spending cannot be quickly accelerated during recessions because

⁸ For example see: Holtz-Eakins (1991), Temple (1994), Poterba (1995), Wang and Hou (2009), and Fisher and Wassmer (2015).

non-transit capital projects are rarely shovel-ready. The results show state governments took four years or more to spend all ARRA funds designated for capital projects. All but two governments said less than half of the ARRA funds were spent within the first year. The main barrier to having shovel-ready projects is that designs for non-transit projects quickly become outdated. Designs may become quickly outdated due to changes in building code regulations and environmental assessment impact standards.

Second, most governments finance capital spending with a mix of current revenues and borrowing. The share of capital spending that is financed by current revenues is very likely to behave pro-cyclically. Capital spending that is bond-financed is more stable over the business cycle because bond-financing itself is stable over the business cycle. The barriers to raising funds in municipal bond markets are minimal. Obtaining voter approval was not reported as a barrier to raising funds via bond sales. Another potential barrier is lack of demand for government bonds during recessions. However, governments report they generally are able to raise their desired amounts of funds in municipal bond or short-term money markets. Furthermore, funds raised from the sale of bonds cannot legally be used to pay for operating expenses. This means funds allocated for capital projects cannot be taken to compensate for revenue losses.

Third, credit rating agencies can impose implicit fiscal rules on state and local budgets. This can encourage state and local governments to save rather than spend during a downturn. In order to maintain or achieve excellent credit ratings, state and local governments adhere to fiscally austere budget practices during recessions. This means even if a government could engage in countercyclical capital spending, it may not, if it is seeking to maintain or achieve a favorable credit rating.

The paper is structured as follows. Section 3.2 discusses the importance of state and local government capital spending for countercyclical fiscal policy. Section 3.3 reviews the relevant literature on macroeconomic fiscal policy pertaining to state and local government capital spending. Section 3.4 discusses the qualitative and survey methodology. Section 3.5 presents the main results from the open-ended interviews and structured questionnaire. Section 3.6 includes suggestions for making state and local capital spending more effective as a countercyclical tool.

3.2 The Importance of State and Local Government Capital Spending for Countercyclical Fiscal Policy

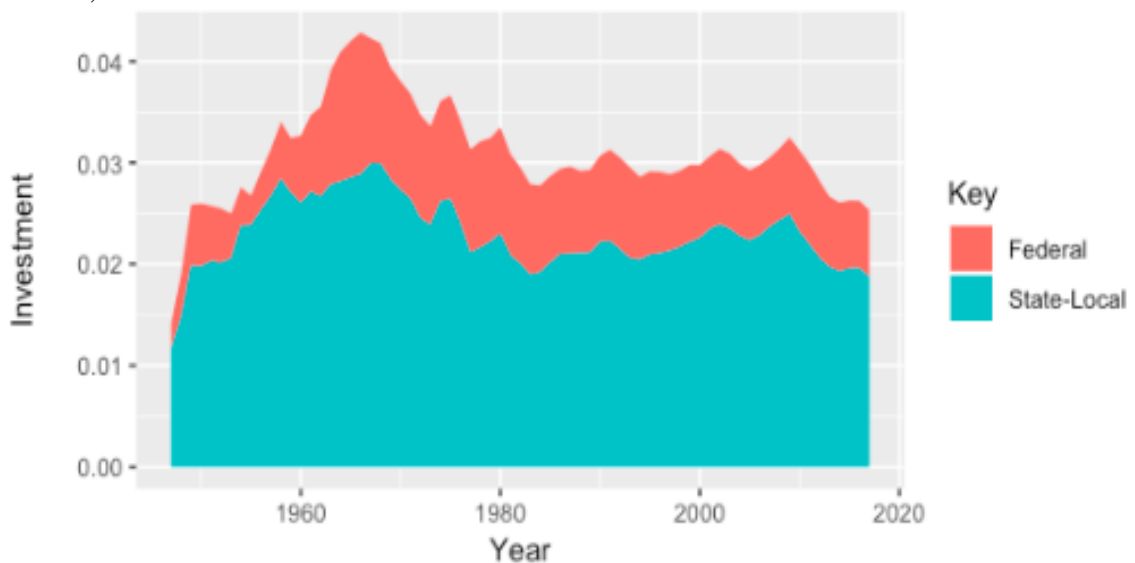
State and local governments are responsible for the majority of public capital spending in the United States. In theory, capital spending is an ideal countercyclical tool. This is because it directly hires workers which provides people with incomes for consumption. In practice, capital projects are relied upon by policymakers to quickly inject investment spending into the economy.

The federal government is usually thought of as “the” government but in reality, people engage with state and local governments far more often. The fifty state governments and 90,000 local governments are responsible for administering and managing essential services. Local property taxes fund public schools and state taxes fund state universities. Local governments oversee public parks and libraries while state government handle programs like Medicaid and higher education.

In providing these vital services, state and local governments contribute substantially to the economy. In 2016, total federal government spending was 23% of U.S. GDP. State and local government total spending was 14% of GDP. However, the

relative sizes of the federal government and state-local government sector reverse when transfers and interest are subtracted from overall spending. Since 1970, aggregate state and local government consumption and investment level has been larger than federal government consumption and investment. State and local government consumption and investment has remained fairly constant around 12% of GDP where federal government consumption and investment has fallen from about 12% in 1970 to less than 7% in 2016. When it comes to capital spending, the distribution is even more dramatic. State and local governments conduct about 75% of U.S. nondefense capital spending with the federal government conducting the remaining 25%. Figure 3.1 shows this distribution of investment has been historically consistent, with state and local governments conducting the lion's share of public investment since 1947.

Figure 3.1: Federal and Aggregate State-Local Government Gross Investment as a Share of GDP, 1954-2015



Source: Federal Reserve Economic Data

In principle, there are good reasons to think of state-local capital spending as a viable countercyclical tool. First, capital expenditures directly stimulate the economy by

employing workers to build and repair the nation's infrastructure. Research has shown that federal transfers for capital spending yield relatively large increases in output and employment (Whalen and Reichling, 2015, p. 11). This is because other federal stimulus efforts such as tax cuts are less likely to encourage spending and investment. Second, capital spending can be financed by borrowing. Balanced budget rules legally prohibit state and local governments from deficit-financing operating expenditures to varying degrees. However, the majority of governments can legally borrow to pay for capital investment (National Conference of State Legislatures, 1999). Thus, in theory state and local governments could operate capital spending on a countercyclical basis.

In practice, policymakers sought to use state and local governments as conduits for countercyclical spending in the experience of the ARRA. A major goal of the ARRA was to accelerate investment spending via "shovel-ready" projects – projects that were ready for construction at the time the stimulus program was enacted.

However, state and local governments operate distinctly from the federal government and some of these differences may impede their ability to leverage capital spending as a countercyclical policy tool. Not only is state and local government financing for capital projects distinct, but there are significant institutional differences as well. The potential barriers may be constitutional in nature or be derived from the practical reality of the capital project process. Few studies in the overall macroeconomic fiscal policy literature have investigated these issues. In the following section, I review the handful of exceptions. I show that although these studies are a solid start, there is still much to be learned about the practical, on-the-ground barriers to capital spending on the state and local government level.

3.3 Literature on State-Local Government Capital Spending in Macroeconomic Fiscal Policy

In this section, I present an overview of contemporary macroeconomic fiscal policy literature pertaining to state and local government capital spending. The purpose of this overview is to demonstrate that there is a need for more research on the role of state and local government capital spending in countercyclical policy. My research fills this gap by investigating the practical and institutional barriers to countercyclical fiscal spending on the state and local level.

Many studies have been conducted on the impact of the American Recovery and Reinvestment Act (ARRA). However, the majority of the studies reviewed work from the basic framework of finding the change in government spending and change in output and employment to calculate jobs and output multipliers. Much thought is exercised in these studies in choosing novel instrument variables or techniques for estimating multiplier effects. In general, much less attention has been devoted to tracing where the transfers went and the timeframe in which the funds were spent.

An exception is the work of Marglin and Spiegler (2013). They use both econometric and qualitative methods to investigate the effects of the ARRA transfers to state governments. Their qualitative methodology featured open-ended questionnaires which were sent to state budget officers. The questionnaires asked state government officials directly what they did with the ARRA stimulus funds they received. More importantly, the questionnaire allowed the researchers to understand what would have happened to state government spending in the absence of ARRA funds. The qualitative results suggest that without the ARRA funds, state governments would have cut spending even further than they did during the recession.

Pollin et al. (2014) investigate the impact of ARRA's clean energy investment program. These projects overall were budgeted at about \$90 billion over two years, this meant that they constituted roughly 11 percent of the overall ARRA two-year spending injection (p. 252). The authors show the scale of the clean energy appropriations and estimate the number of jobs created by ARRA clean energy projects. As the authors point out, knowing merely the amount of funds that were appropriated to any given project was not an adequate way of evaluating the impact of ARRA spending injections. It is rather most important to determine what was the actual level of spending, not simply the amount allocated to be spent. Pollin et al. also stress that the time lags between the time of appropriation and the time funds were actually spent is critical to understanding actual multiplier effects as they play out in real-time projects.

Carley & Lawrence (2014) also examine what happened to the federal transfers for energy investment under the ARRA. For example, they observe that, "in some cases, ARRA funding outpaced the ability of the agencies to implement even their most shovel-ready projects" (p. 151). Carley and Lawrence further state that of the total Department of Energy (DOE) funds allocated, only 60% were spent within the first three years. The authors list some potential reasons for the delayed spending. These reasons include: 1) lack of staffing; 2) federal government compliance rules; and 3) lack of clean energy investment projects that were truly "shovel-ready," i.e. ready to commence construction.

This paper builds from the three studies reviewed above. These studies think critically about institutional and practical issues that might impact federal transfers from being spent by state and local governments. These studies are a contribution to the broader macroeconomic fiscal policy literature because they do not focus solely on

estimating output and employment multipliers. While these estimates are important, they do not tell us much about the practical and institutional barriers that prevent state-local capital spending from being used countercyclically. In the spirit of Marglin and Spiegler, this paper seeks to learn about state-local spending in practice.

My research will go beyond the scope of these studies in three ways. First, I will examine institutional and practical barriers to spending federal transfers for all capital projects, not only clean energy capital projects. Second, I will explicitly examine the impact of timing in the spending of federal transfers on the state and local government level. Third, I will examine institutional and practice barriers to using state-local government capital spending as a countercyclical tool in general (beyond the issues they face in spending federal transfers for capital projects). In what follows, I investigate these issues using mixed research methods.

3.4 Methodology

In this section I discuss my primary research methods. The two primary methodologies employed are open-ended interviews with state and local government budget officials and a structured questionnaire administered to all 50 state governments and 15 large city governments. I first discuss why I chose to pursue mixed research methods. Then, I describe the research design of the open-ended interviews and structured questionnaire.

Qualitative methods have both unique strengths and weaknesses. In any study, the method of analysis should be chosen on the basis of how well it can answer the research question at hand. The primary strengths of using qualitative methods are 1) the richness

of information collected and 2) the potential to learn new things. Qualitative research is defined by its unstructured character. Qualitative researchers ask questions that do not restrict respondents' answers to a pre-determined set of hypotheses or choices. By doing this, researchers collect an abundance of rich, detailed information. Furthermore, this method opens up the possibility of learning new things. The primary weakness of qualitative methods is that they do not easily lend themselves to straightforward data analysis. Quantitative methods such as econometrics allow for statistical inference and hypothesis testing, provided certain assumptions are met.

The use of qualitative methods in economics has increased in the past twenty years. Starr (2014) surveys the growing use of qualitative methods in economics and discusses how and why they are used. She defines qualitative methods as methods which gather information through an open-ended approach. Such methods include in-depth interviews, case studies, focus groups, fieldwork, and ethnography. She reviews thirty-four studies spanning the fields of macroeconomics, industrial organization, environmental economics, feminist economics, microeconomics, and development economics, and labor. The central finding of the paper is that well-done qualitative work can provide scientifically valuable and intellectually helpful ways of adding to the stock of economic knowledge.

I decided to employ qualitative research methods for two reasons. First, using qualitative methods allowed me to investigate questions that the existing literature does not clarify to an adequate extent. Specifically, we cannot discern from the existing quantitative results how quickly funds for capital projects are spent and what factors might cause delays. Open-ended interviews allowed me to directly examine these issues

with state and local budget practitioners. Second, open-ended interviews allowed me to learn new things. There may be important capital spending determinants that previous researchers, including myself, may have overlooked. Budget practitioners may identify or highlight factors that are important for state-local government capital spending in practice that are not included in existing theories or models. Such insights can contribute to our current understanding of capital spending behavior over the business cycle.

3.4.1 Research Design for Interviews

In first phase of the project, I conducted open-ended interviews with government budget officials from cities, school districts, counties, and states. The population of all state and local governments was available through an unpublished Census of Government database. No formal random sampling was intended for these open-ended interviews, but I did select governments to achieve geographic, political, and size diversity. A full listing of all the governments that participated in an open-ended interview is included in Appendix A.

Two pilot open-ended interviews were conducted in-person with New York City's Citizen's Budget Commission (CBC) and Independent Budget Office (IBO). The CBC is a nonprofit, nonpartisan organization that monitors the finances of New York City and New York State. The IBO's primary purpose is to provide nonpartisan information about the city budget and tax revenues. The information learned in these pilots along with our initial research questions were used to develop the original set of 14 open-ended questions which can be found in Appendix B.

I decided to conduct phone interviews as opposed to in-person interviews. In-person interviews are often thought of as the ideal mode of interviewing. However, phone interviews have minimal cost and are flexible, which can greatly increase the number of interviews conducted (Holt, 2010; Stephens, 2007). A higher response rate is desirable to ensure the group of respondents is diverse along the lines of geography and population size.

Contact information for each government was either listed in the unpublished Census of Governments or on the government's own website. I called or emailed each government and asked to schedule a phone conversation with the capital program director. Although no attempt was made to record the response rate, anecdotally, it was very high. Almost all of the governments contacted were very happy to talk. The conversations usually lasted thirty minutes to an hour. Sometimes the interviewee would forward helpful documents or figures to help highlight their points. Almost all interviewees offered to be contacted again for follow ups or clarifications. Notes were typed out during the call and were summarized and organized immediately after. Some of the governments preferred to answer the questions via email.

Each interview began with two large broad questions: 1) Is your government's capital spending pro-cyclical, countercyclical, or neither and why? 2) If your government wanted to engage in countercyclical spending could they, and what would it take for them to do so? Then, I asked specific follow-up questions which are listed in Appendix 2.

The value of open-ended interviews was apparent when respondents started answering the first question. Almost everyone said that it was complex or it depends on a number of factors that could make capital spending go in one way or another. I often

would learn new things, especially in the first few interviews and added questions in subsequent interviews. I would also hear familiar things, sometimes almost verbatim, in response to a question.

3.4.2 Research Design for Questionnaire

In addition to conducting open-ended interviews, I also administered a structured survey to all fifty state governments and fifteen large city governments. I designed the survey based on the information I gathered in the interviews. Unlike the interviews, the purpose of this survey was to ask state government to choose among a distinct set of options. Since all government officials received the same survey and were asked the exact same questions, we can pool their responses to develop concrete insights to capital spending on the state level. Fowler (2014) outlines the main components of a survey as sampling design, mode of data collection, and question design. I describe each component in turn and discuss how I addressed the common issues in employing survey research.

3.4.2.1 Sampling Design

One of the primary concerns in sampling design is that the sample is not representative of the population. Due to random variation between a sample and a population the results could be subject to sampling error. Sampling error can be minimized by creating a sample frame, or pot of potential participants, and creating a randomized way of picking a sample from the sampling frame. Fortunately, this type of

error will not be an issue since our sampling frame is the entire population of governments and we are picking all of them to be included in the sample frame.

Nonresponse could potentially be a source of error. State budget officials are often busy and may already be inundated with requests for information. However, I took pre-survey steps to reduce potential nonresponse bias. I reached out to each state government for an open-ended interview. This provided three benefits. First, I used the information learned in the open-ended interviews to leave out obvious questions. This allowed me to make the survey short, more precise, and written in terms that the state budget officials use and understand. For example, I learned it was important to define capital spending and recessions. The shorter, easier, and less confusing the survey is, the more likely the official will accurately fill it out. Second, conducting an initial open-ended interview with the budget official allowed me to establish a working relationship. Thus, when I asked them to complete a follow-up survey, many obliged. Third, the open-ended interviews allowed me to directly ask when would be the best time to send the survey to ensure maximum response. I vetted the survey questions with methodologists and economists alike and piloted the survey with two states to check for clarity and ease of completion.

3.4.2.2 Mode of Data Collection

There are four major ways a questionnaire could be administered: in-person, by phone, by mail, or by an online survey platform such as Survey Monkey. The mode of data collection is usually chosen on the basis of financial feasibility and nature of the project. I decided to administer the questionnaire through Survey Monkey for two

primary reasons. First, online survey delivery is cheaper and less time consuming than the other methods. Second, the compiling of results is subject to less human error. The results from Survey Monkey can be downloaded directly into a statistical program for analysis. The biggest concern with online surveys is low response rate. However, this issue has been addressed (see nonresponse bias discussion above).

3.4.2.3 Designing Questions to be Good Measures

Another concern with surveys in general is that the answers recorded on the survey instrument are not representative of the answers the population would give. This could be caused by misunderstanding questions, not having the information to answer, and distorting answers to please the researcher. I acknowledge this issue and designed the questionnaire to increase the reliability and validity of the responses.

First, I attempted to ensure the respondents' answers are reliable (providing consistent measures in comparable situations). To do this, I ensured each respondent was asked the same questions and made sure each question meant the same thing to each respondent. The first of the two is easily accomplished by sending out the exact same survey link to each state government. The second is more complex. We cannot completely control how each respondent understands a question but we can do things to minimize different interpretations. To this end, I defined terms like "pro-cyclical" and "capital spending" to ensure the terms meant the same thing across respondents.

Second, I attempted to ensure the respondents' answers are valid (answers correspond to what they are intended to measure). To ensure validity, steps must be taken to make sure the respondents understand the question, know the answer, and don't have

any incentive to lie. Conducting prior interviews with several budget officers helped ensure the survey questions were understandable; I learned the terms budget officials use regularly. I minimized the lack of knowledge issue by sending the survey specifically to capital program directors and budget managers. Furthermore, the survey was not about specific numerical data, which minimized the probability that respondents didn't respond for lack of knowledge. However, sometimes the respondent had not been in the office or position long enough to be able to accurately answer the survey questions. This was addressed by allowing the state to stop the survey and come back at a later time. Finally, the questions were devoid of judging the appropriateness of state budget actions and made as objective as possible. This minimized the probability that government officials lied or distorted their answers.

3.5 Results

This section presents the results from my analysis. The two methods I used to generate these results are open-ended interviews with state and local government budget officers and a structured questionnaire sent to all fifty state governments and fifteen large city governments. The purpose of this analysis is to evaluate the extent to which state-local capital spending can be effectively leveraged as a countercyclical tool. I begin by first considering how state-local capital spending behaves over the business cycle. I then examine the factors that can potentially prevent state and local governments from engaging in countercyclical capital spending. I conclude this section by reviewing the key results from the open-ended interviews and the structured questionnaire. The results suggest there are significant barriers to countercyclical capital spending.

3.5.1 Cyclical Orientation of Capital Spending

State and local budgeting officials described capital spending as modestly pro-cyclical or having no cyclical component. Several governments described the behavior of capital spending as autonomous and separate from business cycle fluctuations. These respondents did not believe capital spending had any particular cyclical orientation. A few governments described their capital spending as reflective of large projects being initiated and implemented over the course of several years and not due to any fixed relationship with the business cycle.

Capital spending is like a snake with higher capital spending happening in some years because big projects are conducted and you can see that lump being dwindled down over the years so I wouldn't really characterize it in relation to the business cycle. – New York City, NY

Not cyclical. There might be large scale capital projects in one year and not others. It is not really related to economic health because it is pretty much the same level year to year. - Chicago, IL

Neither – some degree of spending during a recession decreases... we do what we can on budgetary basis. – Los Angeles, CA

Capital spending is somewhat steady. It doesn't really matter if there's a recession. – State of Rhode Island

If you have urgent capital needs such as a crumbling bridge you are going to fix it – you have to – doesn't matter if economy is doing well or not. – State of Illinois

Not cyclical – routine basis, don't fall too far behind in needs, based on needs of district. – Burnsville School District, MN

I would describe it as not cyclical; it is based on need and available funds. – Middletown School District, NJ

Capital expenditures for Harris County have been fairly non-cyclical and spending has been very consistent year to year regardless of the state of the local economy. - Harris County, TX

We do not try and time the market. - Montgomery County, MD

A small number of governments reported their capital spending was either strongly pro-cyclical or counter-cyclical. Governments that reported strongly pro-cyclical capital spending were more likely to be state governments, smaller city governments, or large cities with recent fiscal crises. Their comments suggest that for historical or institutional reasons, they are forced to cut capital spending in a downturn. Governments that reported countercyclical capital spending demonstrated a conscious and intentional effort to stimulate their local economies during a recession.

Because of DC's history with the fiscal crisis in the 1990s, the city has an independent CFO which provides a check on the mayor's budget and city's council's budget. The CFO has the authority to make them rebalance the budget if it is not balanced. It is pro-cyclical – we had to scale back during the recession and it has grown in recent years.
- Washington, D.C.

During a recession instead of cutting people we cut capital. – Logan City, UT

Strongly pro-cyclical because the state can't borrow, the funds for capital spending are leftovers from the operating budget. – State of Colorado

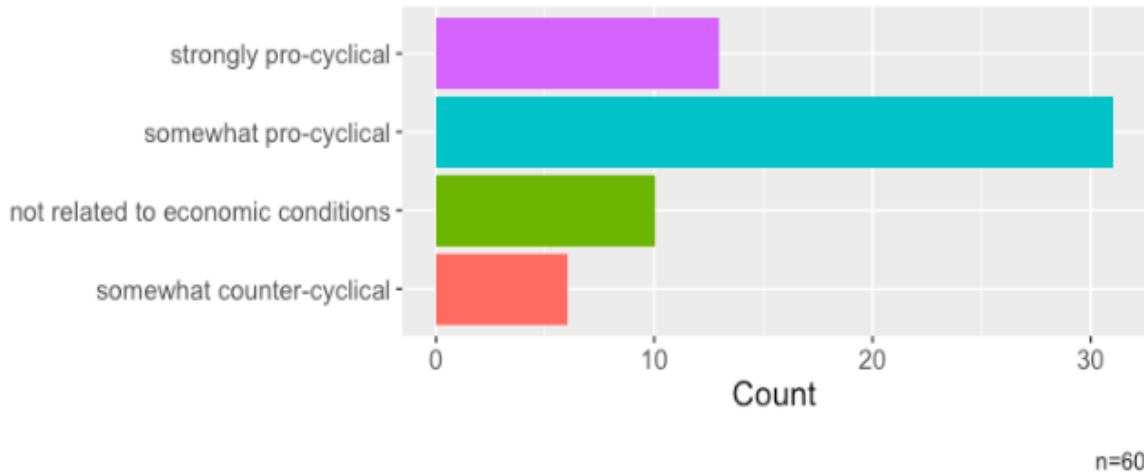
Countercyclical. We were looking for stimulus – transportation or capital facilities, anything that you can bond for. – State of Michigan

The city also built our new city hall building to help our local economy with jobs and income from the building. The state did the same thing so during this period the government was investing in capital and helping... We knew as a city reducing capital spending hurts the area more because those are jobs lost and less money going into our economy through impact fees and other revenues sources. So even with our income decreasing we just offset it through bonding. – Olympia, WA

Capital spending for state governments and large cities was mostly identified as somewhat pro-cyclical. State governments, similar to local governments, had a range of responses regarding the cyclicity of capital spending as Figure 3.2 demonstrates. Somewhat pro-cyclical was the most frequent response.

Figure 3.2 and the quotations above show capital spending was most often identified as non-cyclical or somewhat pro-cyclical across state governments, cities, school districts, and counties. I now investigate what factors are responsible for non-cyclical capital spending and what factors are responsible for biasing its behavior towards pro-cyclicality.

Figure 3.2: Cyclical Orientation of Capital Spending



Source: Author’s survey. Responses are for the question, “In general is your state’s capital spending pro-cyclical, countercyclical, or neither?”

3.5.2 Non-Cyclical State-Local Capital Spending Factors

3.5.2.1 Business Cycle Management Tools

Capital spending is not seen as a tool for stimulating the local economy during an economic downturn. When asked if the governments conduct capital planning with any specific cyclical orientation, such as trying to stimulate their local economy when in a recession, most governments answered capital plans aren’t developed around economic conditions. They also do not utilize the capital plan as a tool for countercyclical spending. A few governments suggested that it would be ideal to use capital spending as a

countercyclical tool. However, because capital needs are urgent, capital planning cannot be used to manage business cycle fluctuations.

We would not deliberately do this – not seen as our role. More of a federal government job. - Phoenix, AZ

We can't be countercyclical agents – that's when we look to federal government. - State of Iowa

In an ideal world we would be counter-cyclical, balancing out the demands for capital construction with the demands of the private market. In San Francisco, it is not possible for us to wait for the next slowdown to address our capital needs. We are growing by about 10,000 people each year, and our infrastructure both vertically and horizontally needs attention today. Construction cost escalation is also so high here that each year we wait is a significant effect on a project's bottom line. – San Francisco, CA

Capital planning was overwhelmingly identified as non-cyclical and based on capital needs. Capital planning is what the government would like to do or proposes to do with an annual capital budget or five-year plan. Budget officials from all types of governments consistently said that capital planning is driven by needs. Capital needs are driven primarily by demographic factors such as population growth and school enrollment. Respondents indicated that the growth or degrowth of a state, city, or school district can impact capital spending needs over time.

There is no official vision or policy related to business cycle... The departments do five year strategic plans and don't really change them based on the economic environment. - Seattle, WA

We don't try to time the market. – New York City, NY

Capital spending is based upon our needs for capital assets to serve our community. – Fargo, ND

The timing of capital projects is based primarily on need, not necessarily the economic environment, though in so much as the economic environment impacts County revenues, adjustments have been made to capital projects. – San Diego County, CA

3.5.2.2 Inherent Lags

Inherent lags in the capital spending process make it difficult to adjust state-local capital spending quickly in response to business cycle conditions. Specifically, projects that have entered the construction phase are not shut down during a recession and new projects are not accelerated.

Once capital projects enter the construction phase, they are not delayed or cancelled in response to a recession. State and local governments report that although they usually have the legal option to cancel contracts, they do not generally exercise this option. There are several reasons for this. First, the funding is already in place for the projects in construction so a decline in current revenues would not force state and local governments to stop them. Second, delaying capital projects can increase the overall cost of the project. Third, an outright cancellation of the project could be seen as a waste of taxpayer dollars and incur a negative response from citizens.

There may be escape clauses written into contracts but it would be rare for a contract to be broken due to lack of funds. Maybe more possible for projects in design phase but less likely for construction. - Phoenix, AZ

All of our contracts have 30-day cancellations – so that is not a difficult task. Contracts are cancelled for all types of reasons; but I haven't known of us cancelling any for loss of revenues. - Nashville, TN

All contracts that are made the funding is secured so the city would not break a contract for lack of funds or delay it. If we have a contract, we have the money. We wouldn't have made the contract if we didn't have the money online. - Chicago, IL

Funding in already in place before contract is signed so, no. - Denver, CO

No breaking, no delays because probably affect bond rating. - Seattle, WA

Construction – highest priority to continue funding – Huge cost to starting and stopping projects. – Los Angeles, CA

It is reasonable to assume committed contracts would stabilize capital spending over a recession...In general, it is more difficult to halt a project once it has started than one that has not. – New York City, NY

It is difficult to produce an immediate acceleration in capital spending in response to a recession. This is likely due to a lack of “shovel-ready” projects. These are projects that are ready for construction within two to three months. State governments received American Recovery and Reinvestment Act (ARRA) funds specifically for shovel-ready capital projects. The projects specifically were to be shovel-ready so the spending could occur immediately and start working its way through the economy to help combat the recession. However, in practice, non-transit capital projects are rarely ever shovel-ready.

The idea behind ARRA funds was that projects had to be shovel-ready but it was very clear that the projects were not and it took longer than expected to expend the funds. - Washington, DC

The idea of ARRA was to bring forth your shovel-ready projects, but there were few and far in between. The lead times were frustratingly long and the city was not prepared to use as much as we could have. The transit agency had a number of projects that were shovel-ready. Generally it took 1 year to set up and probably 2-3 years to spend funds. - Philadelphia, PA

Shovel-ready is a misleading term. Most projects wouldn't be shovel-ready unless they are actually about to start. Funding would have to be in place to do the design and issue the purchase orders and contracts to get the project started. In your example, if the state decided to send the county funds for a specific project, say a new jail or hospital, it would require a lot of steps before the project is shovel-ready. – Harris County, TX

Projects are rarely shovel-ready. - San Antonio, TX

NYC got funds for capital projects during the last recession but didn't have many projects ready to go. We were able to get some smaller, more routine projects done quickly but those projects did not add up to very much spending. – New York City, NY

Difficult to get projects going. If you did have projects shovel-ready, you would have already had the funding. – State of Rhode Island

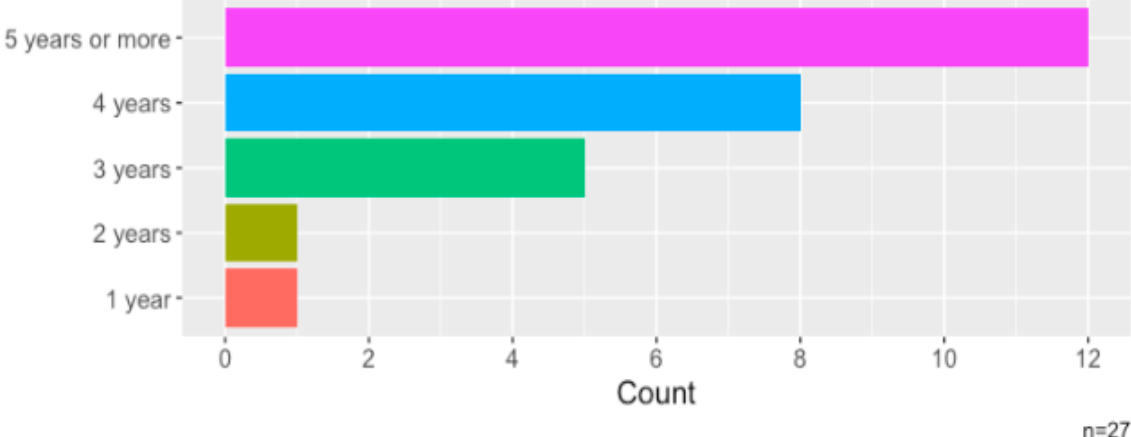
When they say they have shovel-ready projects that's not necessarily the case, bidding process, drawing, specs, lead time can take up to 3-4 years. These projects don't happen overnight. – State of Iowa

Majority of projects are not able to move that quickly, take time and energy. – State of Virginia

Did not have a stock pile of already designed projects – they had to be shovel-ready. - Los Angeles, CA

The timelines I gathered on how quickly ARRA funds were spent support the claim that there were few shovel-ready projects. I find that stimulus funds to state-local governments for capital projects were spent but not quickly. Almost all of the states report it took four years or more to spend all of the funds for capital projects.

Figure 3.3: Length of Time to Spend ARRA Capital Project Funds



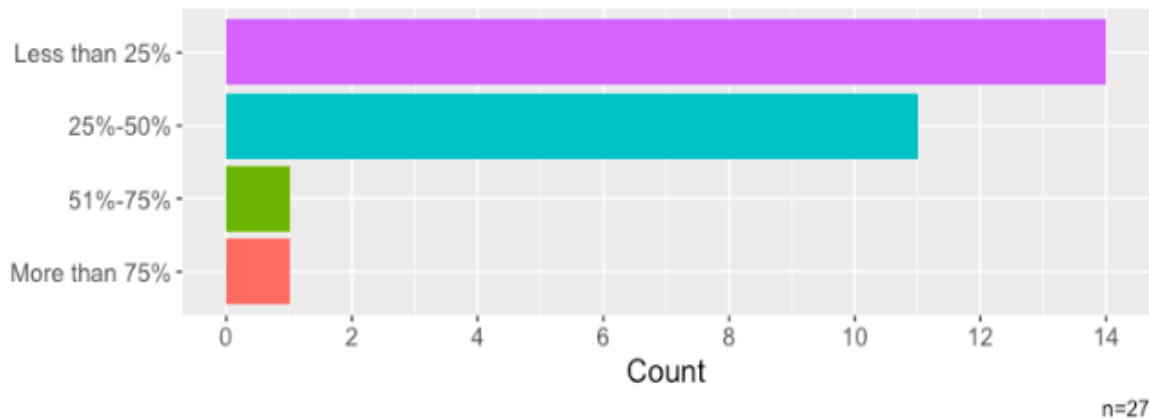
Source: Author's survey. Responses are for the question, "Roughly how long did it take to spend all ARRA funds designated for capital projects?"

As Figure 3.3 shows, the states that received ARRA funds for capital projects report that it took several years to exhaust the funds. Most states (12) report it took five years or more to completely exhaust their ARRA funds. Eight states report it took four years, five states reported three years, one state reported two years, and one state reported one year. Unsurprisingly, all states but two reported they spent less than half of the

allotted ARRA funds within the first year of receiving them. As Figure 3.4 shows about half of the states reported they spent less than 25% of the ARRA funds within the first year.

Projects are often not shovel-ready because designing projects years in advance of construction is not generally feasible. It is increasingly apparent many governments have backlogs and lists of projects they'd like to undertake but these projects are not shovel-ready.

Figure 3.4: Amount of ARRA Capital Project Funds Spent in First Year



Source: Author's survey. Responses are for the question, "About how much of the ARRA funds designated for capital projects were spent within the first year of receiving the funds?"

Given the information on long lead times, the next logical step would be to create designs for big projects and put them on the shelf in the event of a downturn. These projects would then be essentially shovel-ready. Spending on the projects could commence immediately upon the start of a recession. In practice, there are two reasons states cannot have shovel-ready non-transit construction projects. First, on the practical side, the designs are likely to get outdated, and will therefore need to be redone. Second,

governments cannot secure funds for designs without having plans to do the construction in the near future.

The reason you couldn't have a stack of designs is because of the unique capacity issue but also because they become aged so quickly.
– Seattle, WA

Capital plans are done in six year increments and each city department has one so they know exactly what needs to be done. However, we have no money to invest in designs and wait five years for them to be constructed.
- Washington, DC

1. you have to fund people to make designs. 2. be able to build within a year or two because building codes might change. – Los Angeles, CA

Can't cover design costs if not going to be built. - Burnsville School District, MN

It gets expensive to pre-fund these types of projects for design. Our city is also growing rapidly, so it's difficult to design for something when you won't know where it will fit in the City when the time comes for spending the money. – Sioux Falls, SD

The departments of transportation for states are more likely to have projects that could be considered as shovel-ready. The primary reason is that the types of projects these department engage in are more routine. For example, several budget officials reported road repairs such as repaving a highway does not require a design and therefore could be conducted immediately.

The ARRA stimulus was well-designed from the standpoint that about one-fourth of the public investment funds were directed towards transportation departments (Furman, 2018, p. 16). According to U.S. Census of Government data, in 2015, transportation capital spending averaged one-third of total capital spending across state-local governments. Vermont's transportation capital spending was the highest at 53% of

total capital spending. California's transportation capital spending was the lowest at 14% of total capital spending.

3.5.2.3 Political Constraints

Interviewees and survey respondents occasionally argued that political factors create difficulties in utilizing capital expenditures as countercyclical tools. The priorities of the Governor or Mayor could bump up capital spending during one administration and contract it under another. Responding to public priorities was also discussed. It was mentioned several times that the public may not respond well to having a robust capital program (i.e. building new things), if concurrently, the city is laying off teachers and other public workers.

There are two reasons capital spending gets done 1) it needs to be done 2) politics. – State of Illinois

When states are determining how to spend resources there are always political considerations. – State of Arizona

What is probably more binding is political limits – i.e. we need to raise taxes to do a capital project that is partially pay-go but its not politically feasible to do it. - Phoenix, AZ

Local politics - Sometimes things get funded or don't get funded – different administrations. – Philadelphia, PA

Politically, we try to stay away from borrowing in recessionary times. With lack of confidence in long-term revenues, there usually isn't an appetite to borrow for capital projects. – Sioux Falls, SD

This section has presented the factors that contribute to non-cyclical capital spending. Capital budgets are not seen as a tool for managing the business cycle. Furthermore, in practice, capital spending cannot be cut or accelerated quickly. In addition to reporting non-cyclical capital spending, state and local governments also

reported somewhat pro-cyclical capital spending. We discuss the factors that contribute to pro-cyclical capital spending in the next section.

3.5.3 Pro-Cyclical State-Local Capital Spending Factors

3.5.3.1 Funding

Almost all interviewees alluded to the source of funding for capital spending when asked why it behaves as it does over the business cycle. State and local governments finance capital spending in a variety of ways. The two primary categories of funding are current revenues (pay-go sources) and borrowing (issuing long-term debt). In general, the governments that rely on pay-go funding have less stable capital spending over a recession.

You can look at capital spending as having a bond side and a cash side. During a recession, the cash side goes down sharply. – State of Delaware

In short, given that capital funds come from a variety of sources, the answer to your questions would vary program-by-program depending on that program's principal funding source, as well as whether the program tends to be debt financed or cash financed...Phoenix's capital funds generally come from sales tax revenues, sales tax-backed bonds, property tax-backed GO bonds, user fees, bonds backed by user fees...some of those sources are inherently more recession-proof than others... Capital spending is less related to economic cycles than other spending types because it is partially debt financed and not completely financed by current revenues. – Phoenix, AZ

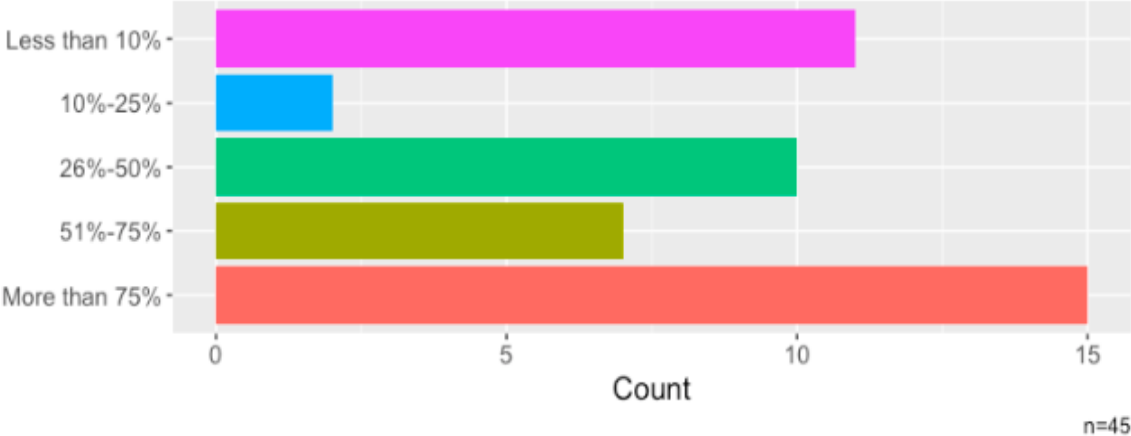
Revenues for the Metro Nashville Govt have been relatively stable over the years; regardless of the economic climate. We have 6 major funds that collect revenue for the Metro Govt. 3 for the Operational Budget: GSD, USD and Schools. And, 3 for Debt Service: GSD, USD and Schools. During economic downturns, the Operational Budget side might be reduced due to revenue shortfalls, but the Debt Service is generally a fixed expense so it doesn't go up or down due to economic factors. - Nashville, TN

Utility rates are stable even in mild to moderate recessions because its not like energy demand falls substantially. Levies are stable because they only get renewed ever so often. And even the smaller levies that were up for renewal during the recession were approved. Real estate excise tax – very cyclical. – Seattle, WA

It really all boils down to funding – if we can get the funding we will do it.
– Chicago, IL

As the budget official from Phoenix notes above, some pay-go streams are more “recession proof” than others. Funding streams that come from sales tax, income tax, or general fund surpluses are highly pro-cyclical. Funding streams that come from utility charges, levies/tolls, or borrowing are significantly less cyclical. Generally, the more reliant a government is on less cyclical revenue streams to fund capital spending, the less cyclically capital spending behaves. Governments that fund their capital projects from operating fund surpluses for example, are likely to be highly pro-cyclical, holding other factors constant.

Figure 3.5: Percentage of Capital Spending Financed by Borrowing



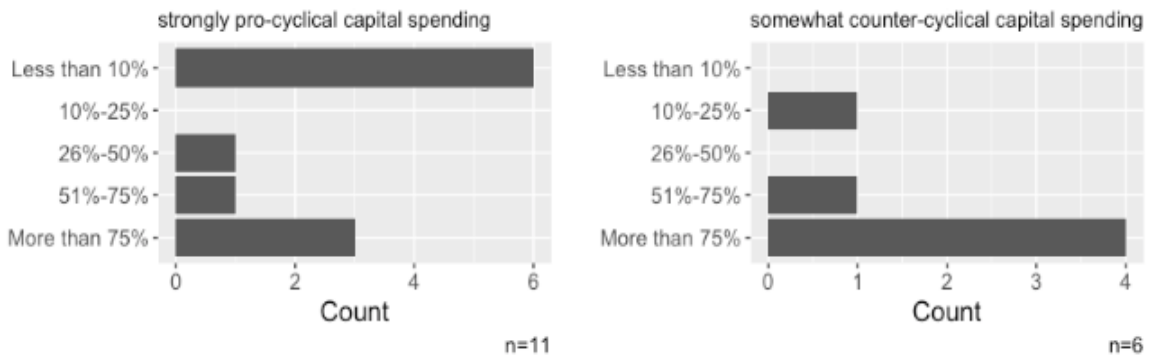
Source: Author’s survey. Responses are for the question, “What percentage of capital spending is financed by borrowing on average?”

The reliance on borrowing for capital projects varies across state governments for political, historical, and legal reasons. The state of Michigan mentioned a movement

among states towards “debt affordability”. That is, the idea states should borrow less to keep debt servicing costs down. These movements can potentially be political in nature, with those leaders that believe higher state debt for any purpose to be a bad thing, arguing for more pay-go financing. Some states like Colorado have legal limits on how much borrowing they can do for capital projects which are binding.

Figure 3.6 shows that states with highly pro-cyclical capital spending are much more likely to finance through pay-go and states that have somewhat countercyclical capital spending rely more on borrowing to finance. State governments that finance capital spending by borrowing are more likely to report somewhat countercyclical capital spending. While pay-go sources are likely to decrease during a recession, bond financing is more stable.

Figure 3.6: Percentage of Capital Spending Financed by Borrowing for Governments Reporting Strongly Pro-cyclical Capital Spending and Governments Reporting Countercyclical Capital Spending



Source: Author’s survey. Responses are for the question, “What percentage of capital spending is financed by borrowing on average?”

Borrowing by selling general obligation (GO) bonds or other types of government bonds sometimes requires voter approval. In theory, even bond financed capital spending could be pro-cyclical if voters had to approve a bond sale in the midst of a recession. This

is because voters may vote down a bond issuance during a recession due to public perception of affordability. However, in all of the governments that I canvassed; no bond sales had failed because a bond referendum was on the ballot during a recession year.

Part of the capital improvement plan is funded by property taxes and the other part of the capital improvement plan is funded by GO bonds. The GO bond portion happened to be countercyclical since the voters approved a bond (2007) issue that was a reliable funding source throughout the downturn. – Denver, CO

Voter-approved 2005 money went online 2007 which allowed financing through recession. – State of California

Voters approved a large levy in 2007 which allowed steady financing throughout the recession. – Seattle, WA

Furthermore, in practice, the lag time between when a bond issuance is approved and the time the money actually gets spent to pay designers or contracts can be substantial. Taking this into account, even if a bond issuance were on the ballot during a recession and it were voted down, the repercussions may not be felt for several years later.

The last recession's most direct impact on Phoenix's capital spending was the deferral of a portion of a general obligation bond program that had been approved by voters in 2006... That said, because of lags in the process (lag between economic activity and housing market values, between housing market values and tax assessments, and between tax assessments and tax levies), the action of deferring bond projects actually did not occur until 2012. So in this case, the recession influenced post-recession capital spending. - Phoenix, AZ

Not being able to sell bonds, even if voters approve of a sale, is another way bond financed capital spending could be pro-cyclical. However, this was only the case for two state governments, California and Michigan. California and a few Californian cities had issues selling bonds due to fiscal stress (revenues were high from very cyclical revenue streams such as capital gains tax and huge deficits were brought about by the decline of

capital gains tax revenue during the recession). Michigan similarly cited fiscal stress as a reason for increased difficulty selling bonds at normal interest rates.

It is important to note here that most large cities and states use short-term borrowing markets such as the commercial paper market to cover immediate payroll expenses and sell bonds to pay off the short-term borrowing. Difficulty obtaining funds in these markets could similarly cause a disruption in the financing of capital spending and cause it to slow down during a recession. However, this was also not an issue for any state other than California. The reason cities need to use short-term borrowing markets is because there are laws that force them to spend bond proceeds within a short amount of time, 3 years or less, so they don't want to sell all the bonds at once and have to race to spend all the funds. They would rather use short-term borrowing to cover immediate payroll expenses and then do a big bond sale to pay off all the short-term debt.

New York City uses a just-in-time financing model to fund capital projects. The City essentially reimburses itself for projects that are in progress or just finished, rather than raising funds that would sit idle before a project begins... New York City Local Finance Law requires that funds raised from bond sales be spent within 36 months. - New York City, NY

The city needs to spend the funds (raised via bond sales) within IRS guidelines – which means we need to spend the funds within 3 years. – Los Angeles, CA

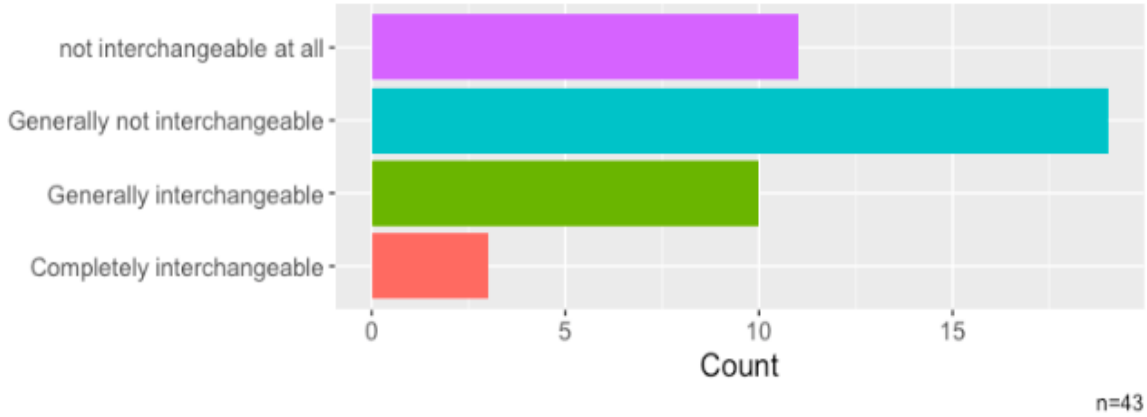
Annual borrowing is determined by the city's cash needs for capital projects. Cash needs are roughly correlated with city capital expenditures in a given year. Cash needs or capital expenditures have little connection to the amount of capital commitments in a given year. Capital commitments (which are dated when a contract for a capital project is registered) occur in one fiscal year but often result in actual expenditures over the course of multiple years. – New York City, NY

Each year the City sets aside a small pot of funds to advance critical projects or planning for projects that will be funded in future bonds. This is done so that early project phases such as preliminary design and

community outreach can be done earlier and bond funds can be applied to construction. This fund gets reimbursed by the bond funds once they are issued so that the fund can be used again in future years. – San Francisco, CA

If funds borrowed for capital projects and current revenues were fungible, capital spending could be pro-cyclical. Funds that were borrowed for capital spending could be used to help shore up operating expenses during a downturn, thus decreasing capital spending. In general, this is not the case. Funds borrowed for capital spending cannot be used to pay for operating expenses. Federal law requires that funds raised through the sale of state-local tax-exempt bonds are spent on capital projects.

Figure 3.7: Fungibility between Funds for Capital Projects and Funds for Operating Expenses



Source: Author’s survey. Responses are for the question, “To what extent can funds for capital projects (not including bonds) and funds for operating expenses be used interchangeably?”

Non-bond funds for capital projects are generally not interchangeable with funds for operating expenditures. When I asked state budget officials to what extent the non-bond funds for capital projects can be used for operating expenses, most reported they were generally not interchangeable. Figure 3.7 shows the government responses to the fungibility question. Eleven governments said the funds were not interchangeable at all

and nineteen reported the funds were generally not interchangeable. A few brief follow-up questions with budget officials suggest that non-bond funds are generally not interchangeable because once the revenues are appropriated to a capital fund or capital budget, they cannot be clawed back to use for operating expenses.

Lastly, state-local government capital spending becomes more pro-cyclical to the extent the government funnels excess revenue to capital projects. Although borrowed funds cannot, in general, be used as a current revenue source, current revenues can in general be used for capital spending. Revenue sources are usually assigned specific expenditure categories but there is flexibility especially when it comes to excess revenues. Capital spending is sometimes seen as a sort of an outlet where excess funds can be placed during good times. This is appealing for two reasons. The first is that it will not disturb the operating budget – temporarily inflating it only to be cut back whenever the excess runs out. Second, it is politically easier to spend money than to save it in a rainy day fund.

When I see the dip in capital spending from 2010-2011, I envision the run-up in the state funds received for educational capital spending. The state was taking in extra money which they choose to invest in education capital. So the fall in capital spending for the city, at least some of it, might be explained by this cut back due to the stopping of the excess revenues at the state level. – New York City, NY

During the last couple of years the State of ND economy dipped significantly due to dropping oil and commodity prices. This impacts our state aid received by political subdivisions. In prior years when oil production was spiking we received a lot more state aid. We were concerned about this spike in revenue as not being sustainable so we programmed the excess revenue into capital project spending so that it would be easy to cut as the revenue was reduced. We did not use cyclical revenue into our general operations even though we could have done so. City leaders and budget developers need to anticipate this type of economic cycling and build sustainable budgets to match existing and future revenue projections. – Fargo, ND

3.5.3.2 Institutional Limits

Debt limits that strongly limit the amount of borrowing for capital projects are likely to lead to pro-cyclical capital spending. For example, the State of Colorado cannot borrow for capital spending and thus is forced to rely primarily on current revenues to finance capital spending. Capital spending behavior over the business cycle then mirrors the current revenue's behavior over the business cycle. However, debt limits overall were not binding for many state governments. The majority of governments with a debt limit said they were "nowhere near the limit".

Debt service limits were major concern for cities with prior fiscal crises. Debt service limits constrain the amount of debt service expenditure (paying down the principal and interest on old debt). For example, the State of Maryland's debt service law states their government's debt service expense may not exceed 8% of available revenues in any fiscal year. Large cities that have experienced prior fiscal crises like Washington, DC and Philadelphia, were more likely to describe debt service limits as constraint for capital spending. In response to question "What barriers are there to the city engaging in countercyclical capital spending?"

Debt service. Our debt service cap is 12% of general fund expenditures"
- Washington, DC

Mostly financial – specifically, our capacity to carry debt service. We have a formula for debt service that is based on assessed value of real estate. - Philadelphia, PA

Credit rating agencies may impose implicit debt and debt service limits even in the absence of a constitutional rule. When discussing institutional limits and guidelines, several of the budget officials brought up the role of the credit rating agencies. It is clear governments of any type aim to behave in a way that satisfies the credit rating agencies'

standards. Many of the governments had favorable credit ratings and have committed to maintain them through prudent practices. Credit rating agencies encourage pro-cyclical capital spending in the same way as debt and debt servicing limits – they reward prudent practices and focus on operating budget health.

The City of Seattle has a very high bond rating and we'd like to keep it that way. So we do monitor debt service to revenue ratios. - Seattle, WA

Bond rating agencies actually like to see more pay-go financing because it naturally forces cuts. - Washington, DC

However, our bond ratings were lowered slightly due to large reductions in our fund balance the last few years. - Hillsborough County School District, FL

If Nashville had sub-par credit ratings or a very high property tax rate or an un-manageable debt capacity situation – then I could see us (or any city for that matter) being “pro-cyclical” in terms of capital spending; but thankfully we are not suffering from those issues. - Nashville, TN

State and local budget officials were often aware of credit rating agencies' preferences. For example, a budget official from Seattle made an explicit connection between the city's high bond rating and its monitoring of debt service ratios. Respondents from Washington, DC believe bond rating agencies prefer financing mechanisms that automatically force spending cuts when revenues decline. A budget official from Hillsborough County School District reported the district's bond rating was downgraded because reserves had been drawn down in recent years. A budget official from Nashville, TN states that he believes if his city had a bad credit rating, it would have hindered its ability to engage in countercyclical capital spending. Since they did not have a bad credit rating, the city was able to engage in capital spending autonomously. These statements demonstrate how credit rating agencies can pressure state and local governments to engage in tight fiscal practices even in the absence of legal rules.

3.5.4 Summary of Results

Budget managers for the most part do not think of capital planning or capital spending as a tool to combat recessions. Capital planning is based on capital needs and unrelated to the business cycle. The primary determinants of capital needs are demographic factors such as population growth and school enrollment.

State and local government capital spending is hard to adjust rapidly. Capital projects that have begun are not terminated, since the funds have already been secured for these projects. Furthermore, it would be costly to delay or cancel projects in which construction has already begun. It is difficult to accelerate capital spending due to a lack of shovel-ready projects. The majority of state and local governments took four years or more to spend all ARRA funds designated for capital projects. They also reported spending less than half of the funds within the first year of receiving them. The main barrier to having shovel-ready projects is that designs for non-transit capital projects become quickly outdated. These findings have critical implications for macroeconomic policy. Specifically, macroeconomic policy makers need to take into account the lag time between state and local governments receiving stimulus funds and spending them on capital projects.

Governments that rely primarily on borrowing to finance capital projects have more stable capital spending over the business cycle. Most governments rely on some mix of current revenue sources and borrowing to finance capital spending. Governments that rely primarily on current revenues report pro-cyclical capital spending. Bond-financing is stable because there are minimal barriers preventing state and local governments from obtaining funds in the municipal bond markets. First, voter approvals

for bond sales are not needed frequently, making it unlikely they would occur in a recession. Second, in general, governments reported they were able to sell the desired amount of bonds in the municipal securities market over the recession and obtain necessary short-term funds in money markets. Third, bond funds cannot be used to pay for operating expenses. Furthermore, non-bond funds meant for capital spending are generally not used to pay operating expenses. Brief follow ups with budget officials suggest that once non-bond funds are appropriated to a capital fund, they cannot be clawed back to pay for operating expenses.

Credit rating agencies may impose implicit debt and debt service limits even in the absence of a constitutional rule. When discussing institutional limits and guidelines, several of the budget officials brought up the role of the credit rating agencies. It is clear governments (of any type) aim to operate in a way that satisfies the credit rating agencies' standards. Many of the governments had favorable credit ratings and were committed to maintain them. Credit rating agencies encourage pro-cyclical capital spending in the same way as debt and debt servicing limits – they reward prudent practices and focus on operating budget health.

3.6 Conclusion

The purpose of this paper is to investigate the extent to which state and local government capital spending can effectively contribute to the management of business cycle fluctuations. This is motivated by two factors. First, the sheer size of the state-local government sector implies that fluctuations in its spending will have significant impacts

on the macroeconomy. Second, state and local governments were featured centrally in the federal stimulus effort following the 2007-2009 Great Recession.

In 2016, total federal government spending was 23% of U.S. GDP. State and local government total spending was 14% of GDP. However, the relative sizes of the federal government and state-local government sector reverse when transfer payments and interest payments are subtracted from overall spending. Since 1970, state and local government consumption and investment has remained near 12% of GDP. Federal consumption and investment, on the other hand, has declined from 12% of GDP in 1970 to roughly 7% of GDP in 2016. When it comes to capital spending, the distribution is even more dramatic. State and local government capital spending accounts for three-fourths of overall non-defense public investment in the United States.

Because state and local governments are responsible for the majority of capital investment in the United States, they were a central focus of the ARRA. More specifically, a major goal of ARRA was to accelerate investment spending via “shovel-ready” projects – projects that were ready for construction at the time the stimulus program was enacted.

In principle, there are good reasons to think of state-local capital spending as a viable countercyclical tool. First, capital expenditures directly stimulate the economy by employing workers to build and repair the nation’s infrastructure. Research has shown that federal transfers for capital spending yield relatively large increases in output and employment. This is because other federal stimulus efforts such as tax cuts are less likely to encourage spending and investment. Second, capital spending can be financed by borrowing. Balanced budget rules legally prohibit state and local governments from

deficit-financing operating expenditures. However, the majority of governments can legally borrow to pay for capital investment. Thus, in theory state and local governments could operate capital spending on a countercyclical basis.

To investigate the extent to which state and local government capital spending can operate as a viable countercyclical tool, I drew on two distinct methodologies. I conducted open-ended interviews with budget officials from state and local governments across the United States. I also administered a structured questionnaire to state budget offices of all fifty states and fifteen large city government. These methods allowed me to investigate questions that the existing literature did not clarify to an adequate extent. Specifically, I was able to understand the importance and impact of lags in the capital project spending. I was also able to learn things that I would not have known given the existing literature. For example, state and local government budget officials do not think of capital spending as a countercyclical policy tool. Such insights can contribute to our current understanding of capital spending behavior over the business cycle.

This paper finds that straightforward use of countercyclical state-local capital spending is complicated by three major factors. First, there are substantial lags between funding allocation and actual capital spending. The questionnaire results show state governments took four years or more to spend all ARRA funds designated for capital projects. All but two governments said less than half of the ARRA funds were spent within the first year. This lag between funding allocation and actual spending is due to a lack of shovel-ready projects. The main barrier to having shovel-ready projects is that designs for non-transit projects quickly become outdated. Designs may become quickly

outdated due to changes in building code regulations and environmental assessment impact standards.

Second, capital spending that is financed by current revenues will be pro-cyclical. Capital spending that is bond-financed is more stable over the business cycle because bond-financing itself is less dependent on business cycle fluctuations. My qualitative results suggest that the barriers to raising funds in municipal bond markets are minimal. For example, some governments need to obtain voter approval to sell bonds. However, voter approvals for bond sales are not needed frequently. Another potential barrier is lack of demand for government bonds during recessions. However, governments report they generally are able to raise their desired amounts of funds in municipal bond or short-term money markets. Furthermore, funds raised from the sale of bonds cannot legally be used to pay for operating expenses. This means funds allocated for capital projects cannot be taken to compensate for revenue losses.

Third, credit rating agencies impose implicit fiscal constraints on state-local government budgets. In order to maintain or achieve excellent credit ratings, state and local governments adhere to fiscally stringent budget practices. This means even if a government could engage in countercyclical capital spending, it may not choose to do so, if it is seeking to maintain or achieve a favorable credit rating.

This research can be used to develop policy suggestions towards using state-local capital spending more effectively as a countercyclical tool. Detailed policy recommendations are beyond the scope of the paper, but I do offer three brief suggestions. First, state and local governments should minimize, to the extent possible, state-local capital spending's pro-cyclical bias. One way to accomplish this is to increase

the share of capital spending that is financed by borrowing. In general, bond-financing is more stable than current revenue sources over the business cycle. State and local governments that finance a large portion of capital spending through current revenues should carefully reconsider their financing composition. This may imply deviating from historical precedent or reconsidering institutional rules that prevent borrowing for capital projects.

Second, state and local governments should identify the specific features of their budgets that can be used countercyclically. My research shows departments of transportation are best suited to engage in countercyclical capital spending. This is because state and local governments report their department of transportation are most likely to have shovel-ready projects. Brief follow-up interviews suggested that transit departments engage in many routine projects that do not require demanding designs. Therefore, they can begin these projects as soon as funding is secured. Future research should investigate other potential reasons why departments of transportation are more likely to have shovel-ready projects and more importantly, the extent to which the findings may be applicable to non-transit departments.

Third, the creation of public credit rating agencies could reduce the pressure on state-local government budgets. Though the issuance of bond ratings, credit rating agencies can indirectly control how state and local governments manage their budgets. Fiscally stringent governments receive high ratings. There have been numerous articles documenting the role private credit rating agencies played in the financial crisis, but few studies that attempt to understand their role in inhibiting state-local government capital spending opportunities.

Fourth, the federal government needs to operate with more clarity as to which spending streams can operate as countercyclical tools. Policymakers at all levels need to recognize that federal transfers to state-local governments to finance non-transit capital spending will not be effective in the short-run. My results show that federal transfers to state and local governments for capital projects had spending lags of up to four years.

Overall, this paper demonstrates that although there are many reasons in principle to use state-local government capital spending as a countercyclical tool, in practice, there are significant barriers to doing so. If state and local governments are to be conduits of countercyclical fiscal policy, the implications outlined above must be seriously addressed.

CHAPTER 4

INVESTIGATING THE STATE-LOCAL GOVERNMENT SPENDING SLOWDOWN, 2010-2015

4.1 Introduction

This paper examines the composition and growth of state and local government budgets in terms of their impact on business cycles in the United States. In particular, I investigate how the composition and growth of state and local government spending has altered the state-local government sector's role in economic recoveries. The importance of this question is underscored by the deviation of state-local government spending behavior from historical norms.

In the aftermath of the Great Recession, state and local governments cut their overall spending, effectively counteracting federal government expansionary policy. This marked a break from historical precedent (Harris and Shadunsky, 2013; Furman, 2016). In the past, state and local governments increased their spending following economic downturns. But in the most recent recovery period, instead of supporting federal fiscal stimulus, state and local government spending has acted as a drag against it.

If this state-local government spending behavior is the new norm, it may significantly undercut future federal government countercyclical fiscal policy. This means if state-local government spending can no longer be relied upon as a positive force in economic recoveries, all else constant, future recoveries will be slower and weaker compared to historical recoveries. Thus, it is critical to identify the main sources of the change in state-local government spending behavior. Understanding the spending

slowdown is vital to the design and implementation of effective macroeconomic fiscal policy.

The purpose of this paper is to identify the main drivers of the state-local government spending slowdown during the 2010-2015 economic recovery. Towards this goal, I examine two potential sources of the change 1) the composition of state-local government spending and; 2) the determinants of state-local spending growth.

I first quantify how much state-local government spending contracted in the wake of the Great Recession relative to historical recovery periods. I then utilize an accounting decomposition to examine the extent to which any particular component of spending drove the slowdown. Then, I turn to an econometric analysis to investigate determinants of state-local spending growth. Building from the existing literature, I model state and local government spending growth as a function of both non-political and political factors.

These two distinct methodologies identify key barriers to state and local government countercyclical spending. First, the accounting decomposition results suggest that the negative growth of current operation spending explains about 52% to 64% of the overall spending slowdown from 2011-2015. Education spending can alone account for 30% of the slowdown, on average, from 2010 to 2015. Second, the growth in federal transfers and individual income tax revenue helped stabilize overall spending during the first year of the 2010 recovery. Third, state governments with governors affiliated with the American Legislative Exchange Council (ALEC) are associated with slower growth in total spending while other factors are held constant. These results suggest that any efforts to utilize state and local governments as countercyclical agents would first have to

address the severe cuts to education spending. Furthermore, these results have shown states run by ALEC affiliated governors are more likely to have experienced slow spending growth from 2010 to 2015. This means the ALEC model for state governments is a critical impediment to effective countercyclical fiscal policy.

The paper is outlined as follows. Section 4.2 demonstrates the state-local government spending slowdown in the most recent recovery. Section 4.3 decomposes total spending growth to identify which components of state-local government budgets were most responsible for the slowdown. Section 4.4 describes the econometric analysis. In particular, Section 4.4.1 reviews the existing theoretical and empirical literature on the determinants of state and local government spending. Here, I introduce a new political determinant of state-local government spending: the American Legislative Exchange Council (ALEC) variable. Section 4.4.2 discusses the primary data and econometric methodology. Section 4.4.3 presents and discusses the key econometric model results. Section 4.5 summarizes all of the key results and recommends proposals towards future countercyclical state-local government spending.

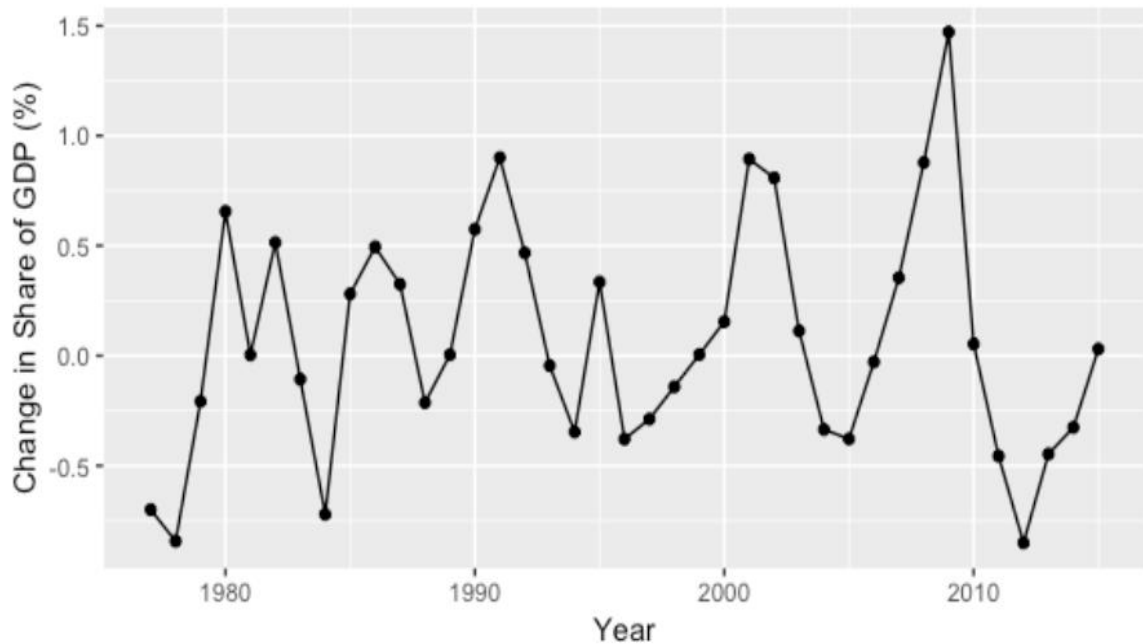
4.2 State-Local Government Spending Slowdown in the 2010 Recovery

This section demonstrates and discusses the state-local government spending slowdown in the most recent recovery from 2010 to 2015. I present evidence that state-local government spending growth was weaker in the most recent recovery compared to historical recoveries both in terms of duration and depth.

State and local governments are important actors in the economy in terms of both their size and function. Because the magnitude of their spending is so large, these

governments, in aggregate, have the capacity to exacerbate a recession or slow down a recovery. Figure 4.1 shows the annual change in the state-local government sector's total spending as a share of GDP from 1977 to 2015. Figure 4.1 demonstrates that state and local government spending experienced sustained negative growth during the most recent recovery. In particular, the figure shows the state-local government sector experienced zero or negative growth from 2010 to 2015. A period of such prolonged, severe, and weak growth is historically unprecedented. The 1975 recovery from 1977 to 1979 comes close in terms of the depth of weak spending growth. The 1991 recovery from 1996 to 1999 comes close in terms of the duration of weak spending growth. But the most recent recovery exhibits severity and duration of weak growth unlike any historical recovery.

Figure 4.1: Aggregate State-Local Government Spending, 1977-2015

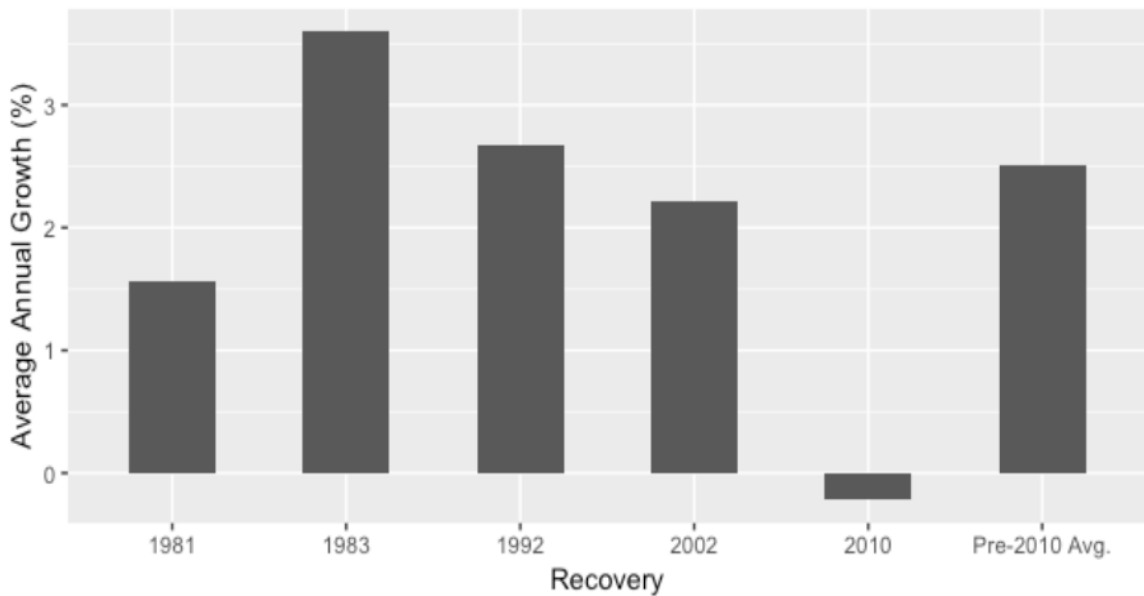


Source: Census of Governments, author's analysis.

Figure 4.2 demonstrates the same basic point more clearly. Each bar represents the average annual growth rate over the specified recovery. For example, during the 1981

recovery, the state-local government sector’s total real, per-capita spending grew an average of 1.5% per year. Figure 4.2 shows in each historical recovery, average annual state-local real per-capita expenditure growth was positive. In fact, the state-local government sector’s spending grew on average 2.5% each year in recoveries occurring before 2010. When we compare this to the expenditure growth during the most recent recovery, the break from historical trend becomes apparent. Between 2010 and 2015, state and local government spending growth actually contracted. For each year of the 2010 recovery, spending for the state-local government sector as a whole, decreased on average by about 0.22%.

Figure 4.2: Aggregate State-Local Government Spending Growth during Recoveries



Source: Census of Governments, author’s analysis.

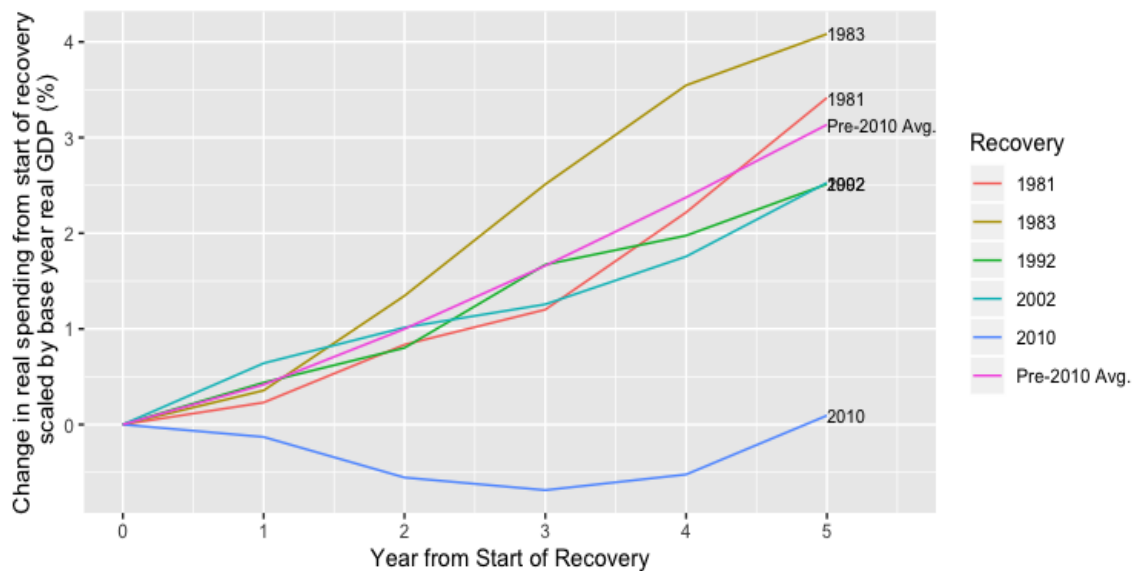
Figure 4.3 presents another direct comparison of state-local government spending growth during the most recent recovery to historical recoveries. The x-axis of Figure 4.3 represents the year from the start of the recovery. For the 2010 recovery, 0 is the year 2010 (start of recovery), 1 is the year 2011 (one year into the recovery), 2 is the year

2012, (two years into the recovery) and so on. The y-axis is the change in real state-local government spending since the beginning of the recovery scaled by the base year's real GDP. Total spending and GDP are deflated by the GDP deflator. The base year (start of recovery) is taken from the National Bureau of Economic Research (NBER) business cycle dates.

The 2010 line in Figure 4.3 represents the state-local sector's spending growth for the 2010 recovery. It shows that during the first four years of the recovery, spending growth was negative. During the fifth year of the recovery, spending growth was zero. This means the level of spending in 2015 was the same as the level of spending during the start of the recovery in 2010. This is in stark contrast to the recoveries that occurred before 2010.

The "Pre-2010 Avg." line in Figure 4.3 is an average of all the pre-2010 recoveries. By comparing the Pre-2010 Avg. line with the 2010 line, we can observe how spending growth during the 2010 recovery for the state-local government sector has deviated from spending growth during historical recoveries. Spending growth during the first year of the 2010 recovery is not horribly inconsistent with the first year of historical recoveries, but as the 2010 recovery continues, the gap between the 2010 recovery and historical recoveries widens. Five years into the 1981, 1983, 1992, and 2002 recoveries, spending had grown, on average, by about 3% since the start of the recovery. This is in direct contrast with spending growth during the most recent recovery which indicates that cumulative spending growth was about zero five years into the recovery. Clearly, cumulative spending growth in the most recent recovery is a substantial deviation from historical spending behavior.

Figure 4.3: Real Aggregate State-Local Government Spending Growth during Recoveries



Source: Census of Governments, author's analysis.

This section has established that the state-local government sector experienced a spending slowdown in the most recent recovery that was not indicative of spending behavior in prior recoveries. The remaining sections of the paper will begin to investigate why this spending slowdown occurred. Section 4.3 examines the potential determinants of the slowdown using an accounting decomposition. Sections 4.4 – 4.6 examine the potential determinants of the slowdown using econometric modelling.

4.3 Decomposition of the Spending Slowdown

This section utilizes an accounting decomposition to examine the determinants of the state-local government spending slowdown during the most recent recovery from 2010-2015. I first briefly discuss the benefits of using accounting decompositions. Then, I discuss how they are applied here to examine the spending slowdown. I then decompose state-local government spending growth using two different accounting identities. I also

include a decomposition of total state-local government revenue. I present and discuss the results of each. Finally, I summarize what the results imply for determinants of the state-local government spending slowdown during the most recent recession.

The accounting decomposition approach fundamentally allows us to attribute the deviation of overall spending to its subcomponents. Because total spending is composed of several types of spending, the deviation of all the subcomponents equals the deviation of overall spending. This decomposition will enable us to quantify the contribution of each spending subcomponent. In other words, the results of the decomposition describe the extent to which a particular spending subcomponent drove the overall spending slowdown in the most recent recovery. Total state-local government spending can be decomposed two different ways:

total spending = current operations + capital spending + assistance and subsidies + interest on debt + insurance benefits + intergovernmental spending

total spending = education + social services + transportation + public safety + environment, housing and sanitation + government administration + other expenditures + utility and liquor spending + general interest on debt + insurance benefits + intergovernmental spending

In order to investigate the central question of the chapter – what has contributed to state-local government spending’s stagnate growth during the most recent recovery in contrast to historical recoveries – we must first transform the variables into units that will address this question. In other words, we need units that reflect the 2010 recovery’s deviation from historical recovery average. The units in Tables 4.1 – 4.3 are the percentage point difference between spending growth in the 2010 recovery and average spending growth over historical recoveries. For example, the second row of Table 4.1 represents the

difference between the 2010 line and Pre-2010 Avg. line in Figure 4.3. Concretely, the steps taken to produce Tables 4.1 – 4.3 were:

1. Deflate GDP and state-local government sector total spending with GDP deflator.
2. Calculate spending growth for each recovery by taking the change of real total spending and dividing by base year real GDP (i.e. real GDP at start of recovery).
3. Calculate 2010 recovery deviation from historical average by subtracting the pre-2010 total spending growth average (average spending growth for the 1981, 1983, 1992, and 2002 recoveries) from 2010 recovery total spending growth.
4. Repeat steps 1-3 for each subcomponent of spending.

The base year, or start of recovery, is taken from the National Bureau of Economic Research (NBER) business cycle dates.

The second row of Table 4.1 presents the percentage point deviation of total expenditure growth during the 2010 recovery from average expenditure growth over historical recoveries. The second row shows us what Figure 4.3 tells us visually: the first two years into the most recent recovery, spending growth was slower than historical norms, but not by much. Three years into the most recent recovery, spending growth began to deviate substantially from historical norms. By the fifth year of the recovery, 2015, state-local government spending grew about 3 percentage points more slowly than historical recoveries.

The deviation of total expenditure growth recorded in row 2 of Table 4.1 can be decomposed into the deviation of total spending subcomponent growth: current operations, capital spending, assistance and subsidies, interest on debt, insurance benefits, and intergovernmental spending. We are interested in figuring out what subcomponent of total spending, if any, drove the overall deviation of total spending growth. For that reason, in the bottom panel of Table 4.1, I provide each subcomponent's deviation as a

share of overall deviation total spending. For example, one year into the recovery, the deviation of current operation spending growth from its historical average was about -0.35 percentage points. The deviation of total spending growth was -0.55 percentage points. This means, for the first year into the recovery, the behavior of current operations drove 63% of the deviation of overall spending growth from historical norms.

The bottom panel of Table 4.1 shows several interesting things. During the first year of the 2010 recovery, the growth of current operation spending accounted for 63% of the deviation of overall spending. However, this percentage drops to 52% in the last year of the 2010 recovery. This could mean that an important reason why spending growth in the early years of the 2010 recovery was so much lower than historical spending growth was because of large layoffs in government employment. Capital spending growth accounted for 23% of total spending deviation in the first year of the 2010 recovery and dropped to 14% and 18% in 2012 and 2013 respectively. This could mean that capital spending meant to occur during the recession was delayed by several years. In 2011 interest on debt only explained about 6% of total spending's deviation from historical norm but by 2015, it explained 10%. This could reflect increased debt taken on during this period to pay for capital projects. During the first year of the recovery, insurance benefit payment growth only contributed about 9% to overall total spending deviation. This implies that the spending growth in this area was closer to historical recovery levels in 2011. However, in 2012, insurance benefit payments explained about 16% of the deviation in total spending. This means after 2011, insurance benefit spending contributed more heavily to overall spending deviation relative to prior

recoveries. Assistance and subsidy spending growth along with intergovernmental spending did not account for any meaningful share of total spending deviation.

Table 4.1: Deviation of Expenditure Growth in 2010 Recovery from Average Expenditure Growth during Previous Recoveries, by Type

Year	2011	2012	2013	2014	2015
Total Expenditure	-0.55	-1.55	-2.35	-2.90	-3.04
Current Operations	-0.35	-1.00	-1.46	-1.63	-1.58
Capital Spending	-0.13	-0.21	-0.43	-0.58	-0.67
Assistance and Subsidies	0.01	-0.01	-0.01	-0.01	-0.00
Interest on Debt	-0.03	-0.09	-0.15	-0.23	-0.30
Insurance Benefits	-0.05	-0.24	-0.30	-0.44	-0.48
Intergovernmental	0.00	0.00	0.00	-0.01	-0.01
As a share of total expenditure deviation					
Total Expenditure	1.00	1.00	1.00	1.00	1.00
Current Operations	0.63	0.64	0.62	0.56	0.52
Capital Spending	0.23	0.14	0.18	0.20	0.22
Assistance and Subsidies	-0.01	0.01	0.01	0.00	0.00
Interest on Debt	0.06	0.06	0.06	0.08	0.10
Insurance Benefits	0.09	0.16	0.13	0.15	0.16
Intergovernmental	0.00	0.00	0.00	0.00	0.00

Source: Census of Governments, author's calculation. Top panel units are percentage points and bottom panel units are in shares of total expenditure deviation.

Another way to decompose total spending growth deviation is by function of spending. This includes: 1) education; 2) social services; 3) transportation; 4) public safety; 5) environment, housing and sanitation; 6) government administration; 7) other expenditures; and 8) utility and liquor spending. Table 4.2, like Table 4.1, shows us how much of the deviation in total spending during the 2010 recovery can be allocated amongst all the possible sources (all of the subcomponents of total spending).

The bottom panel of Table 4.2 implies that the deviation of education spending can consistently account for about one-third of the deviation of overall spending during the most recent recovery (-0.22/-0.55, -0.43/-1.55, and so on). In the first year of the recovery, social service spending accounted for about -3.0% of the deviation in overall spending. This means that social service spending was a source of relatively stable spending growth during the first year of the 2010 recovery. This is not hard to believe since that particular spending stream is most closely related to mandatory spending on the state and local government level. Increases in public welfare payments are likely required during an economic downturn. As the economy began to recover, the negative growth of this subcomponent began to contribute more heavily to the deviation of overall spending. It appears the explanatory power of transportation, public safety, environment and housing, governmental administration, other expenditures, and utility and liquor expenditures were responsible for between 5% and 11% of total spending deviation over the five years of the 2010 recovery.

Lastly, since balanced budget rules in varying degrees tie expenditures to revenues taken in, we may wish to look at how total revenue growth in the 2010 recovery has deviated from its historical average. It is possible that revenue growth during this time period did not deviate as much as expenditure growth. Again, we can decompose this deviation into the deviation of all the subcomponents of total revenue to identify the driving source of the deviation. Total revenue growth can be decomposed into the growth of all its subcomponents: 1) federal transfers; 2) individual taxes; 3) property taxes; 4) sales taxes; 5) corporate taxes; 6) other taxes; 7) charges; 8) miscellaneous revenue; and 9) utility and liquor revenue.

Table 4.2: Deviation of Expenditure Growth in 2010 Recovery from Average Expenditure Growth during Previous Recoveries, by Function

Year	2011	2012	2013	2014	2015
Total Expenditure	-0.55	-1.55	-2.35	-2.90	-3.04
Education and Libraries	-0.22	-0.43	-0.69	-0.84	-0.94
Social Services	0.02	-0.19	-0.20	-0.12	-0.18
Transportation	-0.05	-0.07	-0.16	-0.21	-0.24
Public Safety	-0.06	-0.13	-0.20	-0.25	-0.31
Environment and Housing	-0.04	-0.11	-0.22	-0.30	-0.36
Government Administration	-0.06	-0.10	-0.15	-0.17	-0.21
Other Expenditures	-0.03	-0.06	-0.13	-0.16	-0.20
Utility and Liquor	-0.04	-0.13	-0.16	-0.18	-0.19
Interest	-0.03	-0.08	-0.14	-0.21	-0.28
Insurance Benefits	-0.05	-0.24	-0.30	-0.44	-0.48
Intergovernmental Transfers	0.00	0.00	0.00	-0.01	-0.01
As a share of total expenditure deviation					
Total Expenditure	1.00	1.00	1.00	1.00	1.00
Education and Libraries	0.40	0.28	0.29	0.29	0.31
Social Services	-0.03	0.12	0.09	0.04	-0.06
Transportation	0.09	0.05	0.07	0.07	0.08
Public Safety	0.11	0.08	0.08	0.09	0.10
Environment and Housing	0.07	0.07	0.09	0.10	0.12
Government Administration	0.11	0.06	0.06	0.06	0.07
Other Expenditures	0.05	0.04	0.06	0.05	0.07
Utility and Liquor	0.07	0.09	0.07	0.06	0.06
Interest	0.06	0.05	0.06	0.07	0.09
Insurance Benefits	0.09	0.16	0.13	0.15	0.16
Intergovernmental Transfers	0.00	0.00	0.00	0.00	0.00

Source: Census of Governments, author's calculation. Top panel units are percentage points and bottom panel units are shares of total spending deviation.

The bottom panel of Table 4.3 shows us that federal transfers were able to offset about 2% of the total fall in state-local government own revenues during the first year of the recovery. Two years into the recovery, federal transfers dropped substantially and started contributing to the deviation of total revenues from historical trend instead of counteracting it. The deviation from total revenue from its historical trend can be mostly attributed to the fall in own revenue, which explains an average of 73% of the deviation throughout the five years of the 2010 recovery. During the first year of the recovery, 2011, the deviation of property tax growth accounted for 60% of the overall deviation of total revenue growth. But as the economy recovered in subsequent years, it explained less of the overall deviation of total revenue growth. This means that the growth of property taxes during 2011 deviated significantly from its historical average. Individual income taxes helped stabilize overall spending's deviation from historical average. This is especially true during the first year of the recovery. This could indicate that individual income taxes that are derived from sources like capital gains provided stable revenue growth in the early period of the 2010 economic recovery.

4.3.1 Main Findings from Decomposition Results

Steep cuts in current operation spending, specifically education spending, drove the state-local government spending slowdown. Table 4.1 shows that the deviation of current operation spending from its historical behavior can explain 63% of the slowdown during the first year of the 2010 recovery. The deviation of education spending from its historical behavior can account for 30% of the 2010 spending slowdown on average.

Table 4.3: Deviation of Revenue Growth in 2010 Recovery from Average Revenue Growth during Previous Recoveries

Year	2011	2012	2013	2014	2015
Total Revenue	-0.23	-1.34	-1.90	-2.46	-2.33
Federal Transfers	0.00	-0.61	-0.77	-0.76	-0.51
Own Revenue	-0.24	-0.73	-1.13	-1.70	-1.82
Total Taxes	-0.08	-0.30	-0.50	-0.87	-0.93
Individual Taxes	0.06	0.09	0.12	-0.03	-0.03
Property Taxes	-0.14	-0.29	-0.38	-0.45	-0.49
Sales Taxes	0.00	-0.10	-0.19	-0.26	-0.29
Corporate Taxes	0.00	-0.02	-0.04	-0.08	-0.09
Other Taxes	-0.01	0.01	-0.01	-0.06	-0.09
Charges and Misc. Revenue	-0.13	-0.35	-0.52	-0.69	-0.75
Charges	-0.05	-0.22	-0.28	-0.33	-0.32
Misc. Revenue	-0.08	-0.13	-0.25	-0.37	-0.43
Utility and Liquor Revenue	-0.03	-0.09	-0.11	-0.14	-0.15
As a share of total revenue deviation					
Total Revenue	1.00	1.00	1.00	1.00	1.00
Federal Transfers	-0.02	0.46	0.40	0.31	0.22
Own Revenue	1.02	0.54	0.60	0.69	0.78
Total Taxes	0.35	0.22	0.26	0.36	0.40
Individual Taxes	-0.24	-0.07	-0.07	0.01	-0.01
Property Taxes	0.60	0.21	0.20	0.18	0.21
Sales Taxes	0.01	0.07	0.10	0.11	0.13
Corporate Taxes	0.02	0.01	0.02	0.03	0.04
Other Taxes	-0.04	-0.01	0.01	0.02	0.04
Charges and Misc. Revenue	0.54	0.26	0.27	0.28	0.32
Charges	0.21	0.16	0.15	0.13	0.14
Misc. Revenue	0.33	0.10	0.13	0.15	0.18
Utility and Liquor Revenue	0.13	0.06	0.06	0.06	0.06

Source: Census of Governments, author's calculation. Top panel units are percentage points and bottom panel units are shares of total revenue deviation.

Social service spending increased during the first year of the recovery. Table 4.2 shows that during the first year of the 2010 recovery, social service spending growth contributed negative 3% to overall spending deviation. This means that mandatory spending increases counteracted the deviation of total spending from its historical norm. In some cases, this is beneficial for countercyclical government spending. For example, any mandatory spending increasing that force governments to increase cash contributions to low-income families would help stimulate spending which would support recovery efforts. However, if state and local governments are forced to increase payments into a pension fund to maintain 100% pre-funding levels, it is not clear that this would provide economic stimulus and be useful for countercyclical fiscal policy.

Federal transfers and individual income taxes played a large role in stabilization in the first year of the 2010 recovery, but then became part of the problem. Table 4.3 demonstrates that the deviation of the growth in federal transfers was able to offset the deviation of the growth in own source revenues by 2% during the first year of the recovery. Then, in 2012 the deviation of the growth of federal transfers started contributed to the deviation of the growth in total spending instead of counteracting it.

4.4 Econometric Analysis of the Spending Slowdown

4.4.1 Previous Econometric Models of State-Local Government Spending

This section reviews the existing theoretical and empirical literature on state-local government spending. The purpose of this section is to take stock of what work has already been conducted in this area and use it to develop a model of state government spending. Specifically, I review existing econometric models of state-local government

spending to identify critical determinants of state-local spending. I draw on these findings to develop my own model of state government spending.

Fisher (1961), as an early contribution in the area, investigates the variation in state and local expenditures across states. He uses cross-sectional data for the 48 continental U.S. states from the U.S. Census Bureau's 1957 Census of Governments. To explain the variation in spending across states, he takes into account the differences in each state's:

- personal income per capita
- population density (population per square mile)
- degree of urbanization (percent of state population living in urban places)

He finds population density to be negatively correlated with total expenditures and personal income and urbanization to be positively correlated with total expenditures. Specifically, a \$1 increase in personal income per capita is associated with a \$0.10 increase in total spending (p. 350). He then uses the econometric results to predict total expenditures for each state and measure the difference between expected expenditures and actual expenditures. To explain the difference between the predicted expenditures and actual expenditures, he suggests state differences in the "taste" for government, such as political or social characteristics.

Sacks and Harris (1964) contribute two additional independent variables to Fisher's model: federal aid and state aid. They, like Fisher, draw on the U.S. Census of Government data. They use a cross-section of the contiguous 48 states for the year 1960. They model state-local government spending with the following independent variables:

- personal income per capita
- population density (population per square mile)
- degree of urbanization (percent of state population living in urban places)
- federal aid and state aid per capita

The addition of federal and state aid per capita as independent variables increases the explained variation of total expenditures from 0.53 to 0.81 and the explain variation of highway and welfare expenditures from 0.37 and 0.11 to 0.83 and 0.83, respectively (p. 81). These results indicate federal and state transfers may be critical determinants of state and local government spending.

Bahl and Saunders (1965) expand upon this burgeoning literature by analyzing the *change* in state and local expenditures. Prior studies that modeled state and local government spending had up until this point had only focused on the *level* of spending. They use U.S. Census of Government data for the 48 contiguous states for the years 1957 and 1960. Their model's independent variables include:

- change in personal income per capita
- change in population density
- change in urban population
- change in federal grants per capita
- change in public school enrollment

Their results reveal that the change in per capita federal grants is the only factor which significantly affects the change in state and local per capita spending. The five independent variables together explain about 46% of the variation in total spending per capita across states, with federal transfers per capita accounting for 39% of the 46% (p. 51). Similar to Sacks and Harris, the results of Bahl and Saunders' analysis suggest federal transfers per capita are a critical determinant of state-local government spending per capita.

Horowitz (1968) goes beyond Bahl and Saunders by implementing a simultaneous equation approach to investigate state and local government spending per capita. Horowitz argues the simultaneous equation approach is necessary to address the

intercorrelation among the explanatory variables and state and local government spending. Horowitz hypothesizes that state and local government spending is based on differences in need, fiscal capacity, and tax effort. The independent variables of her model are:

- personal income per capita
- tax effort (taxes collected relative to personal income)
- income inequality (Gini coefficient)
- population level
- population density
- percent of population residing in urban areas
- percent of population that is non-white
- federal transfers per capita

She finds personal income per capita and tax effort to be positively related to total spending. The distribution of income and population density are not very important in explaining cross-state variation in spending per capita. She finds federal aid to be a significant variable in explaining the variation in per capita spending across states. Specifically, she estimates that for states with the same per capita income, tax effort, and distribution of income, state and local expenditures per capita will be \$1.26 more for each one dollar in per capita federal grants (p. 475).

Case, Hines, and Rosen (1989) contribute to this literature by investigating the role of neighboring states governments' spending on the home state government's spending. They review the literature on state and local spending models up until that point noting three things 1) the introduction of utility maximizing principles to model state and local government decision-making 2) the introduction of median voter models and other "political economy" frameworks to model the decision-making process of governments and citizens and 3) regardless of the theoretical framework used to model the decision-making process, models of state and local government spending have usually

depended on a state's income, federal grants, and demographic and/or political characteristics. It then introduces what the authors hypothesize is another important determinant of state-local government spending – the spending of neighboring governments. To investigate this hypothesis the authors draw on panel data from the U.S Census of Governments of the 48 U.S. states from 1970-1985. Their model's independent variables are:

- population (level)
- personal income per capita
- federal grants per capita
- proportion of population above age 65
- proportion of population aged 5-17
- proportion of the population that is Black

They find that a state government's level of per capita spending is positively and significantly affected by the per capita spending of its neighbors even after accounting for fixed state effects and year effects. Specifically, a one dollar increase in a state's neighbor's per capita expenditures increases the home state's per capita expenditure by over \$0.70 (p. 34). They find no significant effect of population on per capita spending. The effect of state per capita personal income is small and statistically significant. There is a large statistically significant coefficient on federal grants. Specifically, states spend per capita roughly one dollar for each dollar obtained in grants per capita. These results are consistent with the findings of the previous literature.

Holtz-Eakin, Rosen, and Tilly (1994) investigate if state and local government spending is driven by the desire to smooth their consumption spending over time. They use time series data for the aggregate state-local government sector from the Bureau of Economic Analysis National Income and Product Accounts from 1934 to 1991. All

variables are the log-differenced, real, and per capita . Their model's independent variables include:

- resources (sum of all taxes and federal grants)
- state and local durable goods purchased
- local transfer payments
- personal consumption of nondurable goods and services
- federal government expenditure on nondurable goods and services

To deal with endogeneity issues they employ lagged values of various variables as instruments. They find state and local spending is determined primarily by current (as opposed to permanent) resources. This means state and local governments do not typically smooth their expenditures over time. Specifically, they find that essentially 100% of the growth rate of state and local spending on nondurable items is determined by the growth in the decisionmaker's contemporaneous level of resources (p. 16). Their results suggest federal transfers to state and local governments are likely to increase spending since such transfers would increase current resources.

Hines (2010) investigates the factors responsible for the cyclical behavior of state and local government spending and revenue. He uses data from the U.S. Census of Governments for the 48 continental U.S. states from 1951-2007. He models 1) the change in the log of real, total expenditures per capita and 2) the change in the log of real, total tax revenues per capita as a function of:

- the change in the log of real personal income per capita
- balanced budget requirement stringency x the change in the log of real personal income per capita
- population x the change in the log of real personal income per capita
- population
- annual change in federal grants-to-income ratio
- population x annual change in grants-to-income ratio

He finds annual changes in state personal income per capita are associated with small changes in state spending per capita and significant changes in tax receipts per capita. Specifically, a one percentage point increase in personal income per capita is associated with a -0.02 percentage point decrease in state spending (p. 324). The coefficient on personal income per capita and its lag are not statistically significant. However, personal income per capita does statistically significantly increase tax revenue per capita. Specifically, a one percentage point increase in personal income per capita increases tax revenue per capita by 0.37 percent. Balanced budget requirements were not statistically significant in any of the specifications of. Population growth was not statistically significant in the models of state government spending per capita, but were statistically significant in the models of tax revenue per capita. The grants-to-income ratio had a large, positive, effect on state government spending. Specifically, a one percentage point increase in the growth of the grants-to-income ratio increased state government spending per capita by 4.9 percentage points.

The literature review has demonstrated that the key determinants of state and local government spending are composed primarily of a government's available resources, demographic factors, and state-specific factors. Holtz-Eakins, Rosen, and Tilly (1994) showed that 100% of a state government's spending is derived from its current resources. The two measures of a government's available resources used repeatedly in the studies reviewed above are 1) federal transfers and 2) personal income. Very early on in this literature, Sacks and Harris (1964) showed that the inclusion of federal transfers was vital to modelling state government expenditures. Their result was consistently validated by subsequent studies which have almost unanimously found federal transfers to be an

economically meaningful, statistically significant determinant of state-local government expenditures. Models of state and local government expenditures since Fischer (1961) almost always include personal income as another measure of a government's available resources, although the size and statistical significance of this variable is less consistent within the literature than the results for federal transfers.

The reviewed models of state-local government spending often include some variation of population. This can be measured by population growth, density, populations of elderly or school-aged people, or population living in urban areas. I chose not to include this variable in my model since the previous studies have not found it to be an important determinant to state-local government spending.

One study that included institutional rules was Hines (2010). He included a variable which represented the stringency of a state government's balanced budget rule. This variable was not found to be statistically significant in any of his specifications nor did the coefficient on the balanced budget variable exhibit a consistent direction or magnitude.

One of the main findings of Case, Hines, and Rosen (1989) was that a neighboring state's spending can influence a state's own spending. To try and incorporate this lesson of the literature into my own analysis, I include a regional dummy variable. This will take into account any geographical similarities between state-local government spending.

Based on this review of state-local government spending models literature, my model controls will include federal transfers, personal income, and regional dummies. The data will be transformed into log-differenced real per-capita spending, federal

transfers, and personal income. The reason for this is because more recent studies that utilize time series or panel data conduct the analysis in terms of growth rates. Earlier studies relied mainly on cross-sectional analysis of level data because multiple years of U.S. Census of Government data were not yet available.

Almost all the prior studies reviewed on state-local government spending models conduct their analysis on the 48 contiguous U.S. states. Alaska and Hawaii are largely classified as outliers. I therefore will review the descriptive statistics for any such outliers.

4.4.1.1 My Contribution

I contribute to this literature by adding an explicit political variable to my model of state-local government spending. This is motivated by the major political shift on the state government level which occurred from 2010 to 2015. In 2010 and 2011, a new wave of state governors came to power across the United States. Almost all of these governors that had public, institutional relationships with the American Legislative Exchange Council (ALEC). ALEC (2019) states:

America's largest nonpartisan, voluntary membership organization of state legislators dedicated to the principles of limited government, free markets and federalism... The ALEC model policy library is home to dynamic and innovative ideas that reduce the cost of everyday life and ensure economic freedom. ALEC ideas and publications are the product of countless hours of research, debate and discussion and serve as a toolkit for anyone who wants to increase the effectiveness and reduce the size, reach and cost of government.

ALEC self-identifies as an organization that aims to shrink the size and scope of the public sector. It promotes private industry as an alternative to the roles and responsibilities traditionally held by the government. Clearly, this ideology – if

implemented by top governmental decisionmakers - could potentially be the cause of spending cuts and overall spending slowdown in the most recent recovery from 2010-2015.

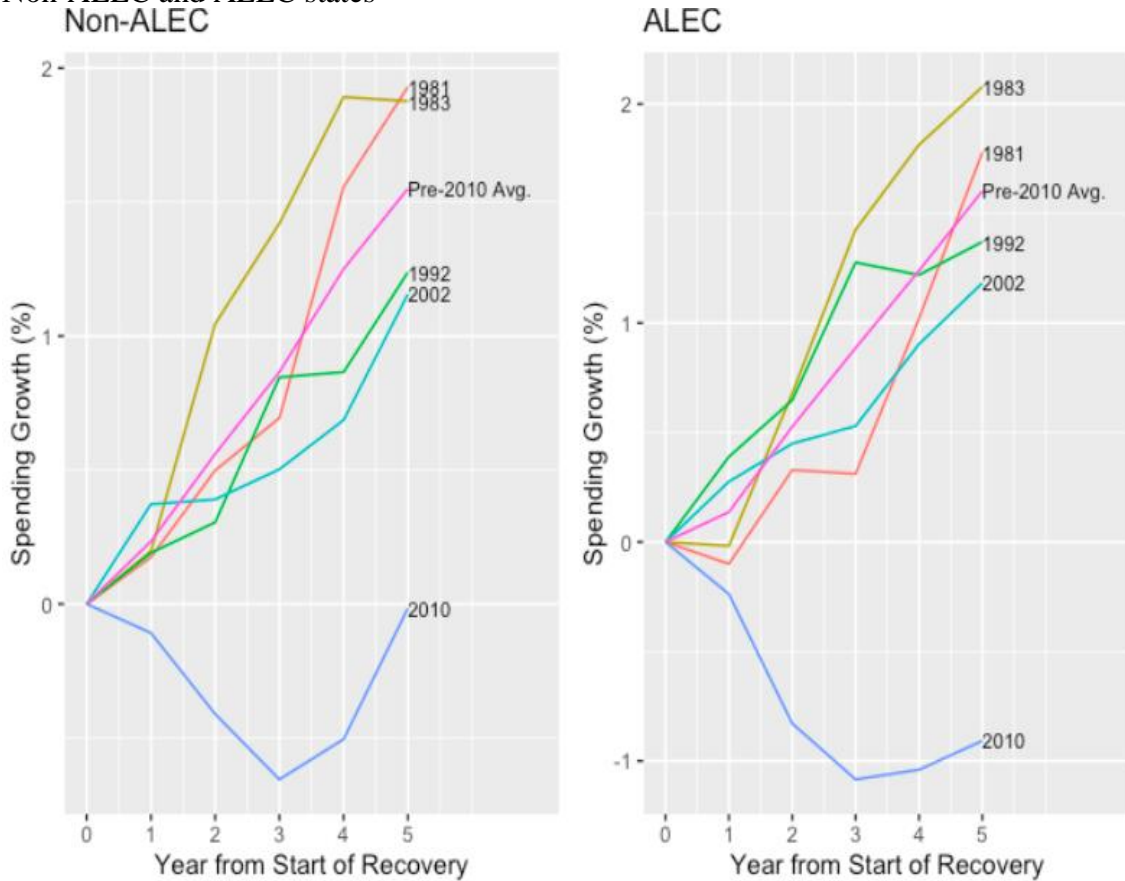
As an initial investigation into the plausibility of this hypothesis, I decompose the spending slowdown from Figure 4.3 into an average of “non-ALEC” states and an average of “ALEC states”. ALEC states are those states that had an ALEC affiliated governor from 2010-2015. A governor is considered “ALEC affiliated” if ALEC’s own website or the Center for Media Democracy (a nationally recognized watchdog group) identifies the governor as 1) an ALEC alumni; 2) an ALEC featured speaker; 3) an ALEC award winner; or 4) an ALEC politician. According to this measure, the ALEC states are: AZ, FL, GA, IN, IA, KS, LA, ME, MI, NJ, OH, OK, SC, TX, VA, WI.⁹

Figure 4.4 documents a clear visual discrepancy between 2010 recovery spending growth for non-ALEC states and ALEC states. By 2015, average total spending for non-ALEC states had recovered to the 2010 level. In 2015, ALEC states’ total spending was, on average, still below the spending level from the start of the recovery.

Overall, Figure 4.4 suggests that it is plausible ALEC state governors intentionally cut spending in their home states during the 2010 economic recovery. This could have potentially driven down total spending growth during this time period for the state-local government sector as a whole.

⁹ A more detailed discussion of the ALEC vs. non-ALEC grouping as well as the data sources used to categorize is presented in Section 4.4.2 Data and Methodology and in Appendix Table A4.1.

Figure 4.4: Real State-Local Government Sector Spending Growth during Recoveries for Non-ALEC and ALEC states



Source: Census of Governments, author's analysis.

Figure 4.4 presents strong descriptive support for the hypothesis that the rise of ALEC affiliated governors contributed to the spending slowdown in the 2010 recovery. However, there may be other factors contributing to the spending slowdown that are not visible in Figure 4.4. For example, ALEC states could have, on average, lower total revenues than non-ALEC states. Then, the clear visible discrepancy between the non-ALEC states average spending growth for the 2010 recovery and the ALEC states average spending growth for the 2010 recovery could actually be due to lower revenue growth and not state governor

affiliation with ALEC. A natural way to hold factors like total revenue constant is with an econometric regression. This is the focus of the next two sections.

4.4.2 Data and Econometric Methodology

In this section, I discuss my primary data and econometric methodology. I first discuss the data from which all the analyses in the paper are developed. I then present my econometric models. Then, I discuss several tests and adjustments I conducted to ensure the results from the model are robust.

4.4.2.1 Data

Following from the findings of the literature reviewed, my model will incorporate variables to represent each of the following components of state government spending: a government’s available resources and its discretionary spending. My contribution to the reviewed literature is a political dummy variable which classifies each state as an ALEC state or non-ALEC state. Table 4.4 lists my independent variables, sign of expected impact, and data source.

Table 4.4: Independent Variables and Data Sources

Independent Variable	Expected Impact	Specification (Data Source)
Federal Grants	+	U.S. Census of Governments
Personal Income	+	U.S. Bureau of Economic Analysis
Total Revenue	+	U.S. Census of Governments
Region dummy	+/-	U.S. Census Bureau
ALEC dummy	-	Center for Media and Democracy

Source: Listed in table

A state’s available resources are a good indicator of their capacity to spend.

Federal grants are the most important determinant of state-local government spending

identified by the literature. Federal grants are transfers given to state governments by the federal government. Federal transfers combined with the state's own revenues compose all the revenue the state government has available to spend. State personal income is another measure of a state's available resources.

Personal income represents all the income accrued to all the residents of that state. It can be thought of as a measure of how rich each state is. Total revenue is another alternative measure we might want to consider to measure state government capacity to spend. The expected impact of federal grants, personal income, and total revenue is positive. This means that an increase in any of these variables is expected to result in increased spending, everything else held constant.

Discretionary spending is the second component of overall spending. This category of spending is represented by the two dummy variables. The regional dummy classifies each state as belonging to the South region, West region, East region, or Midwest region. The East region is left out to provide a baseline for which to compare the other regional dummies. The classification system used to categorize the region of each state comes from the U.S. Census Bureau. The expected impact of the regional dummies can be positive or negative. The previous literature does not give any indication that state government spending is higher in some regions of the country versus other regions. The ALEC dummy equals one if the state has an ALEC affiliated governor and zero otherwise. The ALEC dummy is not time-varying. This means if a state is classified as an ALEC dummy, it is recorded as an ALEC state during the entire time period from 2010 to 2015. The expected impact of the ALEC dummy is negative. This means that if a state has an ALEC affiliated governor, the spending growth in that year will be lower than the

baseline spending growth for non-ALEC states. A negative coefficient on the ALEC dummy would support the hypothesis that ALEC affiliated governors were responsible for a portion of the state-local government spending slowdown in the most recent recession.

The primary data in this chapter comes from the United States Census of Governments. Each year a full census of state governments is completed which records about 300 financial variables. Every five years a full census of all the 90,000 local governments is conducted. The survey year is each individual government's fiscal year from July 1 to June 30th of the following year. The dataset has information both at the aggregate and cross-sectional levels. Figures 4.1 - 4.3 and Tables 4.1 – 4.3 use the aggregate time series data for the U.S. state-local sector as a whole. Figure 4.4 and the econometric analysis below use panel data of all fifty U.S. states from 2010 to 2015, 300 observations in total. The data for total spending, federal transfers, personal income, and total revenue are in units of real, per-capita log-difference. In other words, the data are in units of real, per-capita growth. The GDP deflator was used to adjust for inflation and state population was used to make the data on a per-capita basis.

The ALEC dummy was created from publicly available data from ALEC's own website and the Center for Media Democracy (CMD). The CMD is a nationally recognized watchdog that has won multiple investigative journalism awards for its work on ALEC. It maintains a public database of ALEC sponsored model bills that are introduced in state government legislatures across the country. It also lists ALEC affiliated alumni, featured speakers, award winners, and politicians. A state governor was

classified as ALEC affiliated if either the CMD or ALEC listed the governor as an ALEC:

1. Alumni
2. Featured speaker
3. Award winner
4. Politician

The ALEC states are: AZ, FL, GA, IN, IA, KS, LA, ME, MI, NJ, OH, OK, SC, TX, VA, WI. Appendix Table C.1 records in detail the source used to classify each state governor as ALEC affiliated.

Table 4.5 provides summary statistics of all the variables. The second column of Table 4.5 represents the annual growth rates of total expenditures across states over the years of the most recent recovery. The average growth rate of expenditures during the first year of the recovery was quite high at 4.15%. The average growth rate begins to fall the second year of the recovery and experiences its lowest growth rate -2.44% during 2012. The average state growth rate for expenditures starts becomes slightly positive in 2014 and grows to 2.13% in 2015. This tells us that, on average, state governments experienced the worst spending growth declines from 2011 to 2013, with 2012 being the worst year. The minimum growth rates of expenditure reflect somewhat of a similar picture of severity across the years: 2010 was the best year of the recovery and the worst year was 2012. However, as the average growth rate starts to bounce back by 2014, the minimum growth rate of spending stays depressed throughout 2015. This could indicate that some states did not recovery from the recession, even as the rest of the states began to. The maximum expenditure growth rate across states (last panel of Table 4.5) shows that at least one state did not experience negative growth for any year of the most recent recovery. It is likely that more than one state exhibited this behavior.

The third column of Table 4.5 represents the annual growth rate of personal income across states. The average growth rate of personal income was 0.96% during 2010, grew between 2011-2012 and fell by 1.24% in 2013. It recovered in 2014 and 2015. This exhibits a different pattern than the growth rates of total expenditures. The minimum and maximum growth rates for personal income are mixed over the years of the recovery.

The fourth column of Table 4.5 represents the growth rate of federal transfers across states. The trend of this variable strongly reflects the trend found in the growth rates of total expenditures. The growth rate for federal transfers is, on average, 14.1% in 2010, the strongest growth of any year in the recovery. The average growth rate of federal transfers falls to 0.05% in 2011 and is -12.14% in 2012. It stays negative in 2013 and rebounds in 2014 and 2015. Clear, the largest drop in federal transfer growth happens in 2012, the same drop that total expenditure growth experienced. The minimum and maximum growth rate reflect the same pattern across years.

The fifth column of Table 4.5 represents the growth rate of total revenues across states. Total revenue by far is the most volatile of the financial variables over this time period. For example, in 2010, the minimum total revenue growth was 19.46% and the maximum total revenue growth was 171.49%. On average, states experienced 50% revenue growth in 2010, -19% growth in 2012, and -11% in 2015. The volatility of total revenue growth is likely to come from capital gains recorded as pension fund revenues.

The sixth column of Table 4.5 represents the ALEC dummy variable which is equal to 1 if the state governor is affiliated with ALEC. The ALEC dummy is stationary and not time-varying. This means if a state is classified as an ALEC state, it is an ALEC

state throughout the entire period from 2010 to 2015. Table 4.5 indicates that about 32% of states were classified as ALEC states.

Table 4.5: Cross-State Average Growth Rates, Minimum, and Maximum of All Variables

Year	Total Expenditures	Personal Income	Federal Transfers	Total Revenue	ALEC Dummy
2010	4.15	0.96	14.1	50.51	0.32
2011	-0.86	3.34	0.05	8.23	0.32
2012	-2.44	2.22	-12.14	-18.96	0.32
2013	-1.61	-1.24	-2.83	11.60	0.32
2014	0.44	2.33	1	3.87	0.32
2015	2.13	2.43	4.72	-11.40	0.32
Minimum					
2010	-3.19	-2.65	2.54	19.46	0
2011	-4.07	0.4	-11.12	-9.45	0
2012	-9.39	-2.15	-24.17	-35.45	0
2013	-6.13	-3.89	-18.03	-9.03	0
2014	-6.69	-0.26	-6.84	-10.31	0
2015	-6.2	-5.66	-9.38	-50.43	0
Maximum					
2010	10.84	7.2	27	171.49	1
2011	6.42	8.65	16.79	24.17	1
2012	9.32	12.7	3.48	5.36	1
2013	2.81	2.19	6.22	25.19	1
2014	12.3	4.88	16.87	12.62	1
2015	11.1	5.29	28.84	4.81	1

Source: Census of Governments, author's analysis. All variables are in units of growth: log-difference real, per-capita terms.

Tables 4.5 suggests that there is considerable variation among state government budgets. The maximum and minimum growth rates for each variable indicates that some

states did not experience negative growth rates during the recovery and others experiences disproportionately large negative growth rates during the recovery. The former is likely not contributing to the spending slowdown that is of interest. For this reason, I estimate several different models. The different models reflect adjustments to outliers, trying different measures of revenue, and considering local governments. The purpose of these specifications is to ensure the results are robust and not sensitive to any particular parameter.

4.4.2.2 Econometric Models

Model 1

$$\begin{aligned} \Delta \ln \text{realTotalSpendingpercapita}_{i,t} = & \alpha + \\ & \beta_1 \Delta \ln \text{realFederalTransferspercapita}_{i,t} + \\ & \beta_2 \Delta \ln \text{realPersonalIncomepercapita}_{i,t} + \delta_1 \text{South}_i + \delta_2 \text{Midwest}_i + \\ & \delta_3 \text{West}_i + \delta_4 \text{ALEC}_i + \varepsilon_{-}(i, t) \end{aligned}$$

Model 2

$$\begin{aligned} \Delta \ln \text{realTotalSpendingpercapita}_{i,t} = & \alpha + \\ & \beta_1 \Delta \ln \text{realTotalSpendingpercapita}_{i,t} + \\ & \beta_2 \Delta \ln \text{realPersonalIncomepercapita}_{i,t} + \delta_1 \text{South}_i + \delta_2 \text{Midwest}_i + \\ & \delta_3 \text{West}_i + \delta_4 \text{ALEC}_i + \varepsilon_{i,t} \end{aligned}$$

Model 3

$$\begin{aligned} \Delta \ln \text{realTotalSpendingpercapita}_{i,t} = & \alpha + \\ & \beta_1 \Delta \ln \text{realFederalTransferspercapita}_{i,t} + \\ & \beta_2 \Delta \ln \text{realPersonalIncomepercapita}_{i,t} + \delta_1 \text{South}_i + \delta_2 \text{Midwest}_i + \\ & \delta_3 \text{West}_i + \delta_4 \text{ALEC}_i + \varepsilon_{i,t} \end{aligned}$$

Model 1 is the baseline OLS model. It spans all fifty U.S. states. Model 2 is an OLS model similar to Model 1 except it excludes the observations of state governments

that could potentially receive a substantial amount of revenues from oil and other fossil fuel sources. These states are: AK, ND, WY, TX, and PA (U.S. Energy Information Agency, 2015). The reason for this exclusion is to ensure the regression results are not distorted by stable oil or other fossil fuel revenues. For example, if it is the case that all or almost all state governments that receive a substantial portion of their revenues from oil or other fossil fuels also are not affiliated with ALEC, it will appear those states have higher spending growth. However, the higher spending growth may be more impacted by the stability of oil and fossil fuel revenue rather than a lack of political association with ALEC.

Model 3 addresses any concerns with depending primarily on federal transfers and not other types of revenue. It may be the case that when we account for only the federal transfer portion of revenue ALEC states appear to still have lower spending growth. Model 3 checks to make sure any observed negative impact of the ALEC dummy is robust to accounting for other types of revenue growth.

Models 4 - 6 have the same specifications as Models 1- 3. The difference between Models 1 – 3 and 4 – 6 is that Models 4 - 6 are run on a panel of state-local governments from 2010 to 2015 whereas Models 1 – 3 are run on a panel of state governments only from 2010 to 2015.

Models 1 - 6 use the log-difference transformation of all the variables. The reason for this is that we are interested in expenditure growth. The difference of the logs of the variables yield results that can be interpreted as elasticities – i.e. a 1 percentage point increase in a variable is associated with a x percentage point increase in overall spending. Another reason to use units of log-difference is to remove any potential time trends from

the data. We want to ensure that panel data we are working from is stationary. In other words, any results cannot be attributed to changing means or variance over time.

The null hypothesis that is being tested across all six models is that state government spending does not grow more slowly for states with governors affiliated with ALEC on average, than states with non-ALEC governors. This is expressed econometrically as:

Null hypothesis: $\delta_4 = 0$

Alternative hypothesis: $\delta_4 < 0$

We would fail to reject the null hypothesis if the coefficient on the ALEC dummy variable is statistically equal to zero. This would not support the hypothesis that states with governors affiliated with ALEC are more likely to experience slower spending growth.

4.4.3 Econometric Analysis

This section presents and discusses the econometric model results. I estimate and interpret the six models of state government spending discussed above. The purpose of the models is to investigate if the rise of state governors affiliated with ALEC influenced the state government spending slowdown in the most recent recovery.

Tables 4.6 and 4.7 present the key econometric results. The effect of federal transfers growth on state government spending growth is statistically significant at the 0.05 significance level for Models 1 and 2. This is strong evidence that federal transfers are an important determinant of state government spending growth. Specifically, a 1 percentage point increase in the growth of federal transfers is associated with a 0.24 percentage point increase in the growth of overall state government spending. The effect

of federal transfer growth on state and local government spending growth (Models 4 and 5) is also statistically significant at the 0.01 level but has a slightly smaller coefficient. Specifically, a 1 percentage point increase in the growth of federal transfers for state and local governments is associated with the 0.18 percentage point increase in state-local government spending growth.

The coefficient of personal income growth is statistically significant in five out of the six models. The direction of the coefficient is as expected, positive. This means that for state governments and state-local governments, an increase in personal income growth is associated with an increase in total spending growth.

None of the regional dummies are consistently statistically significant across the state government Models 1 – 3. However, the west regional dummy is statistically significant across all three of the state-local government Models 4 – 6. The sign is consistently negative, meaning that state-local governments located in the western region of the U.S. experience lower spending growth on average, than state-local governments located in the eastern region of the U.S. even when we account for the difference in government resources.

The variable we are most interested in is the ALEC dummy. The coefficient on the ALEC dummy across all six models is negative and statistically significant. This means that an ALEC state experiences lower spending growth, on average, than a non-ALEC state even when we account for differences related to federal transfer growth and region.

Model 1 is the OLS regression for all fifty state governments. It controls for each state's federal transfer growth, personal income growth, and region. The coefficient on

the ALEC dummy is negative and statistically significant at the 95% confidence level. Specifically, state governments that have a governor affiliated with ALEC is associated with, on average, 0.88 percentage points lower spending growth than non-ALEC states.

Table 4.6: Determinants of U.S. State Government Spending, 2010-2015

	(1)	(2)	(3)
	All States	Non-Fossil Fuel	Total Revenue
Federal Transfers	0.243*** (0.016)	0.248*** (0.016)	
Total Revenue			0.066*** (0.008)
Personal Income	0.134* (0.072)	0.095 (0.079)	0.348*** (0.087)
South Dummy	-0.047 (0.477)	-0.228 (0.467)	0.005 (0.567)
Midwest Dummy	0.920* (0.510)	0.323 (0.504)	0.552 (0.607)
West Dummy	-0.378 (0.494)	-0.542 (0.497)	-0.459 (0.587)
ALEC Dummy	-0.883** (0.368)	-0.626* (0.359)	-1.072** (0.437)
Intercept	0.054 (0.399)	0.134 (0.400)	-0.432 (0.481)
Observations	300	270	300
R^2	0.459	0.493	0.235
Adjusted R^2	0.448	0.482	0.219

Source: Census of Governments, author's analysis. All financial variables are log-differenced and in deflated, per-capita terms. Fossil fuel states are: AK, ND, WY, TX, and PA. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Model 2 tests the robustness of this result by running an OLS model with the same variables as Model 1, but only for non-fossil fuel states. The reason for this check is because fossil fuel states can potentially have more stable revenues during national recessions than non-fossil fuel states. In theory, it could be the case that non-fossil fuel states were grouped in the non-ALEC state category, making it appear that non-ALEC

states experienced higher spending growth during recoveries when actually the increased growth is associated with the fossil fuel revenues and not ALEC affiliation. The results of Model 2 demonstrate that when fossil fuel states are account for, there still remains a relatively large, negative, statistically significant coefficient on the ALEC dummy. Specifically, being an ALEC state is associated with 0.63 percentage points lower spending growth on average. The fact that the magnitude of the ALEC coefficient declined slightly from Model 1 may justify this robustness check.

Model 3 tests the robustness of the ALEC coefficient a second way. Model 3 replaces federal transfer growth with overall total revenue growth. This robustness check will make sure that the negative ALEC coefficient found in Models 1 and 2 are not sensitive to only including federal transfer growth and not other types of state government revenue growth. Model 3 results show that the ALEC coefficient remains negative and statistically significant even after taking total revenue growth into account. Model 3 also shows that total revenue growth is a statistically significant determinant to state government spending growth. However, the magnitude of the total revenue growth coefficient is quite small compared to the magnitude of federal transfer growth. The r-squared also drops considerably from Models 1 and 2. This likely means that the original specification was a superior model.

Table 4.7 presents the results of the final robustness check on the ALEC dummy coefficient. Models 4 - 6 have the same specification as Models 1 - 3 except they are run on a panel of state and local governments, as opposed to just state governments. The results of Models 4 – 6 yield largely the same results as Models 1 – 3: state and local

governments with governors that have ties to ALEC experienced lower spending growth on average from 2010 to 2015.

Across Models 4 – 6, the coefficient on the ALEC dummy variable is negative and statistically significant at the 0.01 level of significance. This suggests that even after accounting for potential distortions caused by states that may generate excessive fossil fuel revenue and total revenue growth, state and local governments with governors that are affiliated with ALEC are associated with lower spending growth, on average, than non-ALEC states and their local governments. The magnitude of this effect ranges from 0.92 percentage points to 1.2 percentage points of lower overall spending growth.

Table 4.7: Determinants of U.S. State and Local Government Spending, 2010-2015

	(4)	(5)	(6)
	All States	Non-Fossil Fuel	Total Revenue
Federal Transfers	0.177*** (0.014)	0.183*** (0.013)	
Total Revenue			0.059*** (0.009)
Personal Income	0.110* (0.058)	0.156** (0.064)	0.259*** (0.070)
South Dummy	-0.274 (0.388)	-0.410 (0.375)	-0.237 (0.456)
Midwest Dummy	0.323 (0.415)	-0.164 (0.405)	0.127 (0.487)
West Dummy	-1.111*** (0.402)	-1.346*** (0.400)	-1.115** (0.471)
ALEC Dummy	-1.115*** (0.300)	-0.916*** (0.288)	-1.218*** (0.351)
Intercept	0.204 (0.325)	0.159 (0.322)	-0.140 (0.387)
Observations	300	270	300
R ²	0.406	0.453	0.184
Adjusted R ²	0.394	0.441	0.167

Source: Census of Governments, author's analysis. All financial variables are log-differenced and in deflated, per-capita terms. Fossil fuel states are: AK, ND, WY, TX, and PA. *p<0.1; **p<0.05; ***p<0.01

Like Case, Hines, and Rosen, I do find that current resources are vital to explaining overall spending growth. Like virtually all previous studies, I find that federal transfers are a critical explanatory factor in overall spending growth. The impact of personal income growth in the literature has been mixed. My results add to the mixed evidence by finding it to be a positive, mostly statistically significant explanatory variable. The regional dummy variables turn out to be relatively insignificant for U.S. state governments, contrary to the findings of Case, Hines, and Rosen that neighboring state spending has an important impact on home state spending. However, the western states and their local governments appear to experience lower spending growth on average relative to eastern states and their local governments. This can be a potentially interesting area for future research.

Overall, my results indicate that state governor affiliations with ALEC are associated with lower state government spending growth, on average. This initial result was checked for robustness in three different ways: 1) accounting for the unique stability of revenue for states that generate significant portions of their revenue from oil and other fossil fuels 2) taking into account total revenue growth and 3) running the models on a panel of state and local governments. All six of these models had a large, negative, statistically significant coefficient on the ALEC dummy variable.

4.5 Conclusion

The purpose of this paper is to investigate how the composition and growth of state and local government spending has changed the state-local government sector's

ability to engage in countercyclical fiscal policy. This is motivated by the fact that state and local governments have historically supported federal expansionary policy following economic recessions. During the most recent recovery however, state and local government spending acted as a drag.

If the behavior of state-local government spending during the most recent recovery persists, future federal government stimulus efforts may be undercut. This means if state-local government spending can no longer be relied upon as a positive force in economic recoveries, all else constant, future recoveries will be slower and weaker compared to historical recoveries. Thus, it is critical to identify the main sources of this change in state-local government spending behavior.

To identify the main drivers of the state-local government spending slowdown during the 2010-2015 economic recovery, I examined two potential sources of the change. First, I utilized an accounting decomposition to examine the extent to which the composition of state-local government spending drove the overall spending slowdown during the 2010-2015 recovery. Second, I estimated econometric models of state and local government spending. The models examine the role of non-political and political determinants in the state-local government spending slowdown during the 2010-2015 recovery.

This paper finds that there were significant barriers to state-local government countercyclical spending in the most recent recovery. First, the accounting decomposition indicates that there were steep cuts in current operation spending, specifically education, which drove the state-local government spending slowdown from 2010-2015. Table 4.1 shows that the deviation of current operation spending growth from its historical behavior

can explain 63% of the slowdown during the first year of recovery. The deviation of education spending growth itself can account for an average of 30% of the spending slowdown from 2010-2015.

Second, federal government transfers and individual income tax revenue helped prop up state-local government revenues during the first year of the recovery. Table 4.3 demonstrates that the deviation of the growth in federal transfers was able to offset the deviation of the growth in own source revenues by 2% during the first year of the recovery. Then, in 2012, the deviation of the growth of federal transfers started contributed to the deviation of the growth in total spending instead of counteracting it. This means that for the first year of the 2010 recovery, federal government transfers mitigated the state-local government spending slowdown. After the first year of the 2010 recovery, the behavior of federal government transfers contributed to the state-local government spending slowdown.

Third, the econometric results indicate that states and local governments with governor s that are affiliated with ALEC are associated with lower state government spending growth, on average, from 2010-2015. This initial result was checked for robustness in three different ways: 1) accounting for the unique stability of revenue for states that generate significant portions of their revenue from oil and other fossil fuels 2) taking into account total revenue growth and 3) running the models on a panel of state and local governments. All six of these models had a large, negative, statistically significant coefficient on the ALEC dummy variable.

Following from these results, I propose two broad suggestions that would enable state and local governments to engage in future countercyclical spending. First, federal

transfers to state and local governments need to be expanded in terms of size and duration. The first key result indicates that current operation spending, particularly education, were cut more severely in the last recovery than historical recoveries. This is true even after we take into account the substantial ARRA transfers. This indicates that the size of these transfers needs to be increased. The second key result shows that after the first year of the recovery, cuts to federal transfers actually contributed to the overall spending slowdown instead of counteracting it. This indicates that the federal transfers from the ARRA should have been sustained for a longer period. In other words, as soon as the federal transfers stopped in 2012, state and local government revenues had not recovered. In order for state and local governments to act as countercyclical agents, the federal government must expand the size and duration of transfers.

Second, ALEC models of state government spending should be rejected. The key econometric results indicate that states with governors affiliated with ALEC experienced statistically, significantly lower spending growth over the most recent recovery from 2010 to 2015. This means that states following ALEC models cannot engage in countercyclical spending and effectively are counteracting federal government fiscal stimulus.

Overall, this paper has demonstrated that there are significant barriers to state-local countercyclical spending. It provides some brief, initial suggestions towards using state and local government spending for countercyclical purposes in the future. These suggestions will be discussed in further detail in Chapter 5.

CHAPTER 5

POLICY RECOMMENDATIONS

5.1 Introduction

This chapter makes recommendations towards improving countercyclical fiscal policy on the state and local government level. I first review the key findings of each prior chapter. The purpose of this is to clearly and explicitly identify the aspects of state and local government budget behavior over the business cycle that need to be accounted for in the design of fiscal policy. I then describe, in detail, the specific policy actions that would support state and local government countercyclical spending. These actions are concentrated in five policy areas: 1) expanding federal government support; 2) reforming rainy day funds; 3) utilizing the capital budget; 4) loosening financial constraints; and 5) addressing political constraints.

5.2 Review of Key Findings

The first chapter of this dissertation demonstrated that state and local government budgets have rarely been taken into account in the macroeconomic fiscal policy literature. I argued that it is critical to fill this gap because of the significant impact state and local government budgets can have on overall fiscal policy. First, given the substantial size of the state-local government sector, pro-cyclical spending could potentially neutralize some or all of the federal government's attempt to stimulate the economy during a recession. Second, state and local government budgets are comprised of the types of spending with the relatively largest employment and output multipliers. Stabilizing or expanding these spending streams would support countercyclical efforts. Third, new research in the wake

of ARRA demonstrates that state and local governments in fact do spend transfers from the federal government. In the past, it was believed that state and local governments are not ideal countercyclical agents because they save federal transfers in recessions, instead of spending them. However, the most recent research on the question suggests that state and local governments do spend the majority of federal transfers, thus aiding countercyclical stimulus attempts. Given the potential for state and local government budget behavior to support or counteract federal expansionary policy, the next three chapters were dedicated to investigating state-local government budget behavior during recessions and recoveries.

Chapter 2 investigated how state-local government spending has behaved over historical business cycles and what specific budget components drove the behavior. The findings have several important implications for countercyclical spending. First, state-local government total spending is pro-cyclical, but less pro-cyclical than revenues. This means there are other determinants of total spending over the business cycle beyond simply the fluctuations of revenues. Second, the results show that elementary education is the most pro-cyclical type of spending. This indicates education spending is the most significant drag on state-local government spending in a recession and needs federal support to remain stable. Third, federal transfers and property taxes are important countercyclical sources in state-local government budgets. Expanding these revenue sources during an economic downturn or weak recovery could strengthen state and local government's ability to stimulate their local economies. Lastly, the results show that capital spending is weakly pro-cyclical. This means capital spending is less likely to decrease during a recession than current spending. Capital spending could potentially be

the best candidate for countercyclical spending based on its historical behavior over recessions. I turned to an in-depth assessment of capital spending as a countercyclical tool in the next chapter.

Chapter 3 investigated the extent to which state and local government capital spending can be used to effectively manage business cycle fluctuations in the U.S. The overall finding is that significant barriers presently exist that prevent state and local capital spending from being effectively deployed as a countercyclical tool. First, state and local government capital spending cannot be quickly accelerated during recessions, since non-transit capital projects are rarely “shovel-ready.” Second, most governments finance capital spending with a mix of current revenues and borrowing. The share of capital spending that is financed by current revenues is likely to proceed along a pro-cyclical spending path. Finally, credit rating agencies can impose implicit fiscal rules on state and local budgets that inhibit the governments from pursuing large financing support during cyclical downturns.

Chapter 4 examined the composition and growth of state and local government budgets in terms of their impact on business cycles in the United States. In particular, it asks what drove state and local government spending to counteract federal expansionary policy in the wake of the Great Recession, which was a deviation from the historical trend. The results identify some of the key factors that drove state and local government spending to become a drag in the most recent recovery instead of a supportive force, as in previous recoveries. First, the accounting decomposition results suggest that the negative growth of education and social assistance spending can explain about half of the spending slowdown. Second, cuts in federal government transfers contributed to the spending

slowdown after the second year of the recovery. Third, state governments with governors affiliated with the American Legislative Exchange Council (ALEC) are associated with slower growth in total spending while other factors are held constant. These results indicate that any efforts to utilize state and local governments as countercyclical agents would first have to address the severe cuts to education and social assistance spending. Furthermore, these results have shown states run by ALEC affiliated governors are more likely to have experienced slow spending growth from 2010 to 2014. This means the ALEC model for state governments is a critical impediment to effective countercyclical fiscal policy.

In the remainder of the chapter, I argue that the most promising areas for policy change are: 1) expanding federal government support; 2) reforming rainy day funds; 3) utilizing the capital budget; 4) loosening financial constraints; and 5) addressing political constraints. Expanding federal government support, reforming state-local government rainy day funds, and utilizing the capital budget would require relatively minimal changes to state and local government rules and practices. Loosening financial constraints in this context means making it easier for state and local governments to borrow funds for capital spending. Addressing political constraints means acknowledging that some models of state government, such as those that advocate for weakening or eliminating public programs, are barriers for countercyclical spending at the state level.

One potential policy option not explored in this dissertation is abolishing balanced budget rules. All state governments except Vermont have laws that require them, to varying degrees, to balance their budgets. Abolishing balance budget laws and allowing state and local governments to finance their expenditures like the federal government

may be the most direct way to support state-local government countercyclical spending. However, this would require major legal changes to government constitutions and is the least likely to occur in practice. For this reason, I focus on the areas of policy change that are most feasible within the short-term.

5.3 Recommended Policy Action

The rest of this chapter focuses on the specific policy actions to support state-local government countercyclical spending within these five areas. I discuss each in turn:

1. Expand federal government support
2. Reform state and local government rainy day funds
3. Utilize capital budget
4. Loosen financial constraints
5. Address political constraints

5.3.1 Expand Federal Government Support

The federal government should provide state and local governments with relief funds in the event of recession-induced revenue losses. State and local governments, to varying degrees, must balance their budgets. This means revenue losses will lead to expenditure losses. Spending slowdowns exacerbate recessions and weaken recoveries. To stop this vicious cycle before it begins, the federal government can provide state and local governments fiscal relief. This section first reviews the federal government response to the 2008-09 recession. Specifically, I show how state and local government fiscal distress was addressed in the American Recovery and Reinvestment Act of 2009. Then, I draw on the key findings of my prior chapters to discuss why this response was inadequate. Finally, I discuss strategies to improve federal aid to state and local governments for future recessions.

5.3.1.1 Government Support in 2009

The federal government injected about \$290 billion into state government budgets from 2009 to 2019. Table 5.1 shows about half of those funds were dedicated strictly to fiscal relief. Fiscal relief funds were divided between Medicaid expenses (31%)¹⁰ and state fiscal stabilization funds (18.5%). The next category of the ARRA transfers to state governments supported other non-infrastructure related expenses. These included education spending (10%), TANF and child support (6.2%), unemployment compensation (13.5%), and law enforcement (1%). The last category of the federal ARRA transfers supported state government infrastructure spending. The bulk of the infrastructure spending was dedicated to highways (16.5%), clean water (2%), and housing (1%).

Table 5.1: Federal ARRA Transfers to State Governments, 2009-2019

Category	2009	2010	2011	Post-2011	Total
Flexible state fiscal relief	40.4	72.3	27.9	3.1	143.7
Medicaid	33.9	43.9	11.8	0.4	90
Stabilization Fund	6.5	28.4	16.1	2.7	53.7
Other non-infrastructure purposes	34.3	36.7	13.6	4.3	88.9
Education	2	13.3	11.8	1.8	28.9
TANF and child support	14.9	2.1	0.7	0.2	17.9
Unemployment compensation	17	20.5	0.5	1.3	39.3
Law enforcement	0.4	0.8	0.6	1	2.8
Infrastructure	5.3	12	11.8	28.7	57.8
Highway	5	9.4	8.8	24.9	48.1
Clean water	0.2	1.4	1.8	2.4	5.8
Housing	0.1	1.2	1.2	1.4	3.9
Total	80	121	53.3	36.1	290.4

Source: Gordon, 2016. Units are billions of dollars.

¹⁰ In this paragraph, the percentages in parentheses represent each category's share of the total amount of federal transfers to state and local governments.

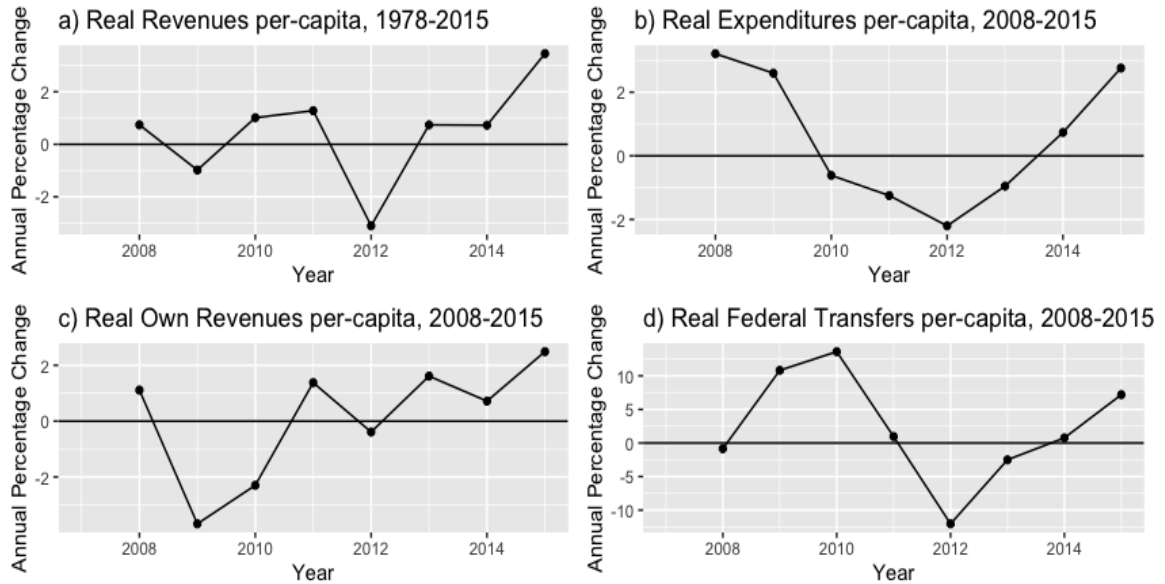
5.3.1.2 Inadequacy of the 2009 Federal Government Response

The federal transfers to state and local governments during the 2008-2009 recession were only temporarily successful. A simple descriptive account of the state-local government sector's total revenues and own source revenues shows that the transfer of federal funds through the Recovery Act only postponed deep spending cuts. The first panel of Figure 5.1 shows the most severe drop in state-local government sector's total revenue growth was in 2012, four years after the recession began in 2008. The second panel of Figure 5.1 shows total expenditure growth for the sector also bottoms out in 2012. The third panel of Figure 5.1 shows that the state-local government sector's own revenue growth had its lowest point during 2009 (-2.0%). This means that the federal transfers in 2009-2011 effectively sheltered state and local governments from the effect of their revenue losses until 2012 when the transfers from the Recovery Act ended as shown in the last panel of Figure 5.1.

The key results from Chapter 2 and Chapter 4 support the claim federal transfers propped up state and local government overall revenue after the severe declines in their own-source revenue. First, Chapter 2 finds federal transfers are countercyclical. This means that federal transfers expand during recessions and contract during economic expansions. Second, Chapter 2 also finds federal transfers are an important determinant to state-local government spending. Specifically, the variation in federal transfers can explain about one-fifth of the variation in overall expenditures. Third, the results in Chapter 4 demonstrate that the deviation of the growth in federal transfers was able to offset the deviation of the growth in own source revenues by 50% during 2010 and by

27% in 2011. Then, in 2012 the deviation of the growth of federal transfers started contributed to the deviation of the growth in total spending instead of counteracting it.

Figure 5.1: Aggregate State-Local Government Real, Per-Capita Revenues, Own Revenues, Expenditures, and Federal Transfers, 2008-2015



Source: Census of Governments, author's analysis. Total Insurance Trust Revenues were subtracted from Revenues and Own Revenues. Total Insurance Trust Expenditures were subtracted from Expenditures. All variables were deflated using the GDP Deflator.

5.3.1.3 Framework for Expanding Federal Transfers

What has the 2008-2009 recession taught us about federal transfers to state and local governments? First, the cursory analysis above indicates that the levels of federal support should have continued until state and local government own-source revenues had fully recovered. This means the level of stimulus of approximately \$75 billion per year for the entire state-local government sector should have continued throughout 2014.

Second, more important than the premature estimation of an actual dollar figure, is developing a framework for estimating the size of the stimulus needed for future

recessions. This was largely absent during the 2009 Recovery Act due to the lack of serious research on how to conduct countercyclical fiscal policy.

A central component of that framework is for state and local governments to engage in a detailed analysis of how much their revenues and expenditures have fallen in both mild and severe recessions historically. Specifically, each state and local government's analysis should 1) identify the most cyclical sources of revenue and expenditure; 2) estimate how much revenue and expenditure has fallen both during historically mild and severe downturns and; 3) estimate how much of a federal transfer would be needed to account for the fall. Then, in the event of a recession, the local governments could submit these figures to the state governments and state governments could give estimates to the federal government as to the amount of aid they are likely to need. Having these estimates ready and the methodology for creating these estimates refined and consistent across governments would increase the speed at which the federal government could pass an accurately-sized stimulus package. Furthermore, it is extremely important to have as precise figures as possible because the likelihood of Congress having the political will to pass multiple stimulus bills is small. So, for example, if state and local governments are underprepared and severely underestimate how much their revenues fall, there is no guarantee Congress will pass another stimulus bill when such a bill is needed.

Third, a detailed discussion of the ways in which the federal government can raise revenue to help finance these transfers to state and local governments is beyond the scope of this paper. However, I briefly mention two revenue raising strategies at the federal level that could help support transfers to state and local governments.

The first is a wealth tax. This would be a tax on net worth (sum of all assets net of debts). It would tax net worth above \$50 million at a rate of 2% and net worth above \$1 billion at a rate of 3%. Saez and Zucman (2019) estimated that such a proposed tax would affect 75,000 households (less than 0.1% of all U.S. households) (p. 1). They estimate a tax of this form would raise around \$2.75 trillion over ten years or \$210 billion each year (~1% of U.S. 2019 GDP). For context, the total amount of funds allocated to state and local governments in ARRA was around \$290 billion from 2009-2019. The wealth tax proposed would be able to generate those funds in a little over a year. As argued above, if a recession occurred that was as severe or worse than the Great Recession, the federal transfers to state and local governments would have to be greater than the \$290 billion ARRA allocated. A wealth tax with the proposed design would be able to generate funds within two years. The remaining funds could be put to other uses. Furthermore, if future recessions are not as severe as the Great Recession, even less funds would need to be generated to support state and local government fiscal relief.

The second is a financial transaction tax. This would be a tax on financial transactions in U.S. financial markets. Pollin, Heintz, and Herndon (2017) examine the effects of one proposed tax structure: 0.5% on all stock transactions, 0.1 % on all bond transactions, and 0.005 % on the notional value of all derivative trades. The authors estimate that this particular tax would generate around \$220 billion a year or roughly 1.2% of U.S. GDP, assuming that trade volume will fall and tax avoidance would increase (pg. 1). This amount is remarkably similar to the wealth tax revenue estimate. Similarly, a financial transaction tax could easily generate enough funds for transfers to state and local governments in the event of a recession of the magnitude of the Great

Recession. It is most likely that the transfers would be less than a tenth of the overall revenue generated and that there would be ample funds left over for other uses.

5.3.2. Reform Rainy Day Funds

5.3.2.1 What do Rainy Day Funds Do?

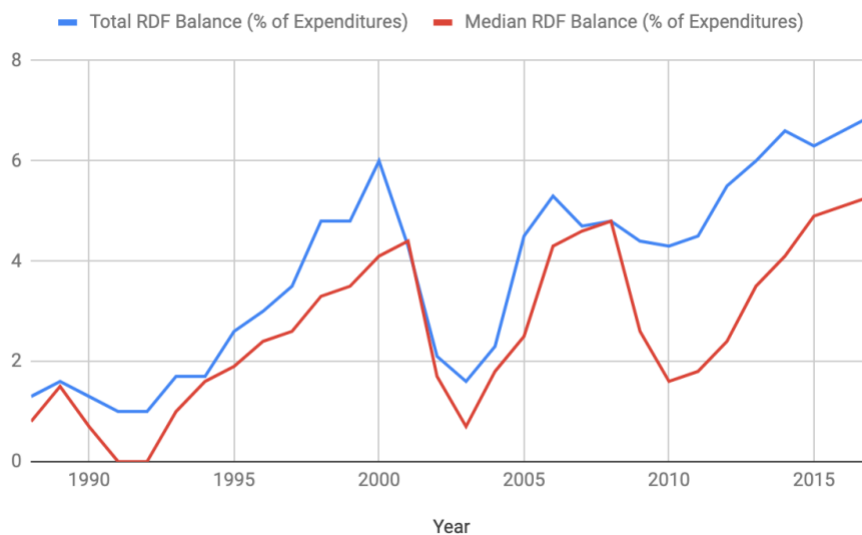
Rainy day funds can be used to increase the capacity of state and local governments to spend countercyclically. Rainy day funds, also known as budget stabilization funds, allow states to save excess revenue for use during unexpected downturns. Rainy day funds do not attempt to alter the behavior of revenues over the business cycle. These funds exploit the existing behavior of state and local government revenues which is strongly pro-cyclical. Rainy day funds simply save the above average revenues that are collected during economic expansions. Then, when an economic downturn occurs, the governments can draw on these funds to stabilize expenditures. Clearly, these types of funds have a lot of potential to help state and local governments engage in countercyclical spending. However, they have historically been inadequate to fully support state and local government declines in revenue. This section discusses the current levels of rainy day funds as well as their existing structures. Then, I discuss the ways in which rainy day funds would have to be reformed in order to meaningfully support state-local government countercyclical spending in the next downturn.

5.3.2.2 Basic Data about Rainy Day Funds

The rainy day fund balance for the entire state sector in 2017 was \$55.4 billion (National Association of State Budget Officers, 2018, p. 6). Rainy day fund (RDF)

balances are often reported as a percentage of total general fund expenditures. Figure 5.2 shows 1) the total RDF balance for all state governments combined as a percentage of expenditure and 2) the median RDF balance as a percentage of expenditure. The total rainy day fund balance for the state government sector as a whole was 6.9% of general fund expenditures in 2017. From 1990 to 2000, the aggregate state sector RDF balances grew from about 2% of general fund expenditures to 6%. The 2001 recession forced state governments to draw down those funds and the total balanced dropped below 2% of total general fund expenditures. From 2003 to 2007 they recovered to about 5% of total general fund expenditures, dropping slightly over the 2008 recession and growing to above 6% from 2014 onward.

Figure 5.2: Total and Median Rainy Day Fund Balance



Source: National Association of State Budget Officers, 2018

The total RDF balance and the median RDF balance behaved similarly until 2008. From 2008-2010, the total RDF balance for state governments in aggregate was stable. Looking only at the total RDF balance over this period, it may appear that state

governments did not use their rainy day fund balances. However, the median RDF balance during the same period fell significantly. This means that the aggregate RDF balance is masking the experience of most of the U.S. state governments – namely their rainy day fund balances dropped significantly over the 2008 recession. Table 5.2 shows rainy day fund balances across states. This clearly shows natural resource rich states like Alaska, Wyoming, and Texas have substantial rainy day fund balances. This is not surprising. The nature of their revenues is very volatile and dependent on external price fluctuations. In order to safeguard their expenditures from potential sudden drops in revenue, they have built up substantial reserves.

Table 5.2: Size of Each State Government’s Rainy Day Fund, 2017

RDF Size: Percentage of General Expenditures	States
Less than 1%	6: IL (0), KS (0), MT (0), NJ (0), NM (0), PA (0)
1% and Less than 5%	17: CT (1.2), KY (1.3), ND (1.5), OK (1.6), WI (1.7), AR (2.3), NY (2.6), VA (2.7), LA (3.1), MA (3.2), MO (3.2), NV (3.7), HI (4.2), FL (4.6), MS (4.7), AZ (4.8), MD (4.8)
5% and Less than 10%	19: TN (5.0), RI (5.2), DE (5.4), OH (5.8), CO (5.9), ME (6.2), SC (6.4), NH (6.6), VT (6.9), MI (7.2), UT (7.9), IA (8.3), NC (8.3), OR (8.4), WA (8.5), AL (9.4), CA (9.4), MN (9.4), IN (9.5)
10% or more	8: GA (10), SD (10.2), ID (12.7), WV (15.4), NE (15.7), TX (19.2), WY (100.5), AK (103.2)

Source: National Association of State Budget Officers, 2018. The amount reported in parentheses is the rainy day fund balance as a percentage of the state’s general fund total expenditures.

5.3.2.3 Cross-State Differences in the Structures of Rainy Day Funds

The size of each state’s rainy day fund depends on three main structural factors:

- 1) how the state decides to make deposits into the fund; 2) if there is a cap on how large the fund can be and; 3) what rules govern how much and under what circumstances the

state can withdraw from the fund. As Table 5.3 shows, about 21 states finance their rainy day funds by allocating some or all of their end-of-year surplus into the RDF. This means if there is no surplus at the end of the fiscal year, the state government cannot make any new deposits into the rainy day fund. Four states make flat contributions to the rainy day fund. For example, California deposits a certain percentage of its capital gains revenue into its rainy day fund while Texas deposits a certain percentage of its oil extraction revenue into its rainy day fund. Nine states make contributions that are tied to overall revenue growth or economic growth. For example, if a state government’s annual revenue growth exceeds 2%, the excess revenue gets deposited into the rainy day fund. Five states have required minimum balances. This means that the state government must continue to make deposits into the rainy day fund until it reaches its minimum required value. Any additional contributions to the rainy day fund would be voluntary. Seven states have some sort of mix of these deposit rules and four state governments have no explicit deposit rules.

Table 5.3: Ways to Finance Rainy Day Funds, 2018

Deposit Mechanism	States
All or percentage of end-of-year surplus	21: CT, GA, KY, ME, MN, MS, MT, NE, NH, NJ, NY, ND, OH, OK, OR, PA, SD, UT, VT, WV, WI
Percentage of total or specific revenue streams	4: AK, CA, NV, RI
Based on revenue or economic growth	9: AR, ID, IL, IN, MI, NM, NC, TN, VA
Required minimum balance	5: CO, FL, IA, MO, SC
Mix	7: DE, HI, LA, MD, MA, TX, WA
No rule	4: AL, AR, KS, WY

Source: Tax Policy Center, 2018

About 80% of state governments have a cap on how large their rainy day fund can be. Again, this cap is usually expressed in terms of percentage of general fund expenditures. Table 5.4 shows the variety of limits state governments have placed on the size of their rainy day funds. 13 state governments – about 25% of all states – cap their rainy day funds at 5% of total general fund expenditures. Historically, the rule of thumb was that state governments should aim to save about 5% of their general fund expenditures to help weather recessions. Clearly, many state governments have maintained this historical precedent. 21 state governments or about 40% of all states have a cap on their rainy day funds between 6% and less than 15%. This limit is higher than the historical precedent of 5% but as I discuss later, this limit is still substantially lower than the literature’s recommended size of rainy day funds. Only 5 states have no formal limit on the size of their rainy day fund. This allows those states to expand and contract their rainy day fund as needed throughout the various stages of the business cycle.

Table 5.4: Caps on Rainy Day Funds, 2014

Cap Category (% of general fund expenditures)	States
5% or Less	13: LA (4), CA (5), DE (5), ID (5), KY (5), NJ (5), NY (5), OH (5), RI (5), SC (5), TN (5), VT (5), WI (5)
Between 6% and 10%	8: UT (6), AZ (7), IN (7), MD (7.5), MS (7.5), MO (7.5), NC (8), ND (9.5)
Between 10% and 15%	13: AL (10), CT (10), FL (10), HI (10), IA (10), MI (10), NH (10), SD (10), TX (10), WA (10), WV (10), ME (12), OR (12.5)
15% or More	5: GA (15), MA (15), OK (15), VA (15), NV (20)
No cap	5: AK, NE, NM, PA, WY
No RDF	4: CO, IL, KS, MT

Source: McNichols, 2014. AL has two funds, I used the number for the General Fund, not education fund. AR has no data, MN varies.

Withdrawal rules are another aspect of state government rainy day funds that can alter their relative size. The National Conference of State Legislatures finds in 2018, almost every state’s rainy day fund requires a budget deficit or declared emergency for withdrawal. The majority of state governments authorize withdrawals through legislative appropriation. This means the state senate and house of representatives approves withdrawals through the normal budgeting process. In 13 states, the chief fiscal officer or governor has the authority to authorize a withdrawal from the rainy day fund, given a budget deficit or natural disaster.

Table 5.5: Withdrawal Rules for Rainy Day Funds Across States, 2018

Withdrawal Method	States
Appropriation	30: AL, AK, DE, GA, HI, IA, KS, KY, LA, ME, MD, MA, MO, NV, NJ, NM, NC, OH, OK, OR, PA, RI, SC, SD, TX, UT, VA, WA, WI, WY
Chief Fiscal Officer or Governor Authority	13: AR, FL, ID, MN, MS, MT, NE, NH, NY, ND, TN, VT, WV
Appropriation based on formula	3: AZ, IN, MI
Other	2: CT (Automatic), CA (must declare emergency then appropriate)

Source: National Conference of State Legislators, 2018. No data reported for CO or IL. If a state had multiple budget stabilization funds, the rules for the general fund stabilization fund were used.

In only three states is the withdrawal based on a formula and in only one state is the withdrawal automatic based on budget deficits. The amount available to be withdrawn is usually capped at the amount it would take to balance the budget deficit. About 15 states also have an additional cap that sets the withdrawal amount at no more than 50% of the reserve balance in any given year. So even if the balance to cover the

deficit was not reached, the withdrawal amount could still be constrained to half of the rainy day fund balance. Finally, 18 states require majority votes of either 2/3 or 3/5 in both houses of the state congress for withdrawals. Sometimes these majority votes are needed to just cover the budget deficits but sometimes they are used to authorize withdrawals from rainy day funds for other purposes (five states).

5.3.2.4 Inadequacy of Existing Rainy Day Funds

Rainy day funds have historically not substantially helped state governments weather economic downturns. Evidence from the two most recent economic recessions in 2001 and 2008 highlight this fact. The median rainy day fund balance in 2002 was \$95.7 million while the median budget gap was \$394.8 million. This means that for the median state government, the rainy day fund reserves were only able to cover about one-fourth of the overall revenue funds necessary. Rainy day funds were even less helpful during the 2008 recession. The median rainy day fund balance in 2008 was \$105.7 million while the median budget gap was \$1.3 billion (Haggerty and Griffin 2014, p. 22). This means that rainy day funds for the median state government were only able to cover about 8% of what was necessary to bridge revenue declines. Of course, any amount of savings is better than no savings. But in these cases, it is clear that the rainy day fund balances were inadequate to help state governments meaningfully stabilize their expenditures during the recessions.

McNichols (2012) comes to similar conclusions in her analysis of state government budget reactions to the 2008 downturn. She finds that state governments relied mostly on spending cuts (45%), emergency federal aid (24%), and tax increases

(16%) to close budget gaps from 2008 to 2012 (pg. 1). Rainy day funds and other reserves only accounted for 9% of closing budget gaps. Although throughout the recession and recovery rainy day funds only accounted for a fraction of the adjustment measures, McNichols shows that drawing down these funds was the first action of these states. For example, during the first year of the 2008 recession, state governments relied mainly on reserves (55.4%) to prevent spending cuts and tax increases. As the RDF became quickly depleted, state governments had to turn to other actions to address budget gaps. By 2012, rainy day and other funds only accounted for 4% of the funds used to close budget gaps. This again, indicates that state governments might have preferred to draw on these reserve funds to prevent harmful spending cuts or tax increases but the RDF balances were exhausted extremely quickly. The state government experience using rainy day funds in the last two recessions can help develop reforms towards making RDF more functional.

5.3.2.5 How Large Should Rainy Day Funds Be?

Evidence from the 2001 and 2008 recession has shown state government rainy day funds have been inadequate to support declines in revenue. The size of these funds needs to be substantially increased in order for rainy day funds to have any meaningful impact on state and local budgets in economic downturns. I first review the literature to establish exactly how large rainy day funds need to be to be effective. Then, I propose strategies to help state governments build their rainy day funds up to the recommended levels.

How big should state government rainy day funds be? Historically, the rule of thumb was 5% of general fund expenditures. However, the experiences over several recessions proved that amount to be too small. Sobel and Holcombe (1996) examine the extent to which rainy day funds help mitigate fiscal stress. They show during the 1990-1991 recession, states with rainy day funds experienced less stress than those without. Furthermore, they estimate that rainy day funds should be about 30% of total general fund expenditures in order to effectively mitigate fiscal stress without having to conduct tax increases or spending cuts (p. 45).

In, “What is so magical about 5%?” Philip Joyce investigates why state governments adhere to the 5% rule and if that rule builds an adequate amount of rainy day funds. He concludes that there is no reason all state governments should adhere to the 5% rule or any other “one size fits all” approach. Instead, he argues the size of each state’s rainy day fund should be based on its revenue volatility (from sources such as corporate taxes and gambling revenues for example). He finds that there is virtually no relationship currently between a state government’s rainy day fund and how volatile its revenues are. Furthermore, he cites prior studies he finds most useful for determining the optimal size of rainy day funds. These studies such as Vasche and Williams (2005) and Navin and Navin (1994, 1997) engage in historical, descriptive studies of how a particular state government’s revenues have behaved and use that analysis to determine when and how much of a state’s revenue should be deposited into a rainy day fund.

Zhao (2016) develops state government rainy day fund targets based on the estimated short-term revenue component associated with business cycles and the extent of states’ preferences for stable tax rates and expenditure. He finds in the last 25 years, at

least 21 states have never saved enough to offset revenue fluctuations. 47 states and the U.S. as a whole did not have enough rainy day funds for at least half of the downturns from 1988 to 2012. The needed size of RDF funds ranges from about 3.2% of general fund expenditure to 40.6% of general fund expenditure. Although this range is lower than Sobel and Holcombe's 1996 finding, the authors other measures range from 6.4% to 139.0% and 12.1% to 171.0% (p. 133).

There have been some calls for a national rainy day fund that operates like insurance. States that are experiencing a downturn may take from the fund when their individual state is facing a downturn. Since not all states experience business cycles at the same time, those states doing well could contribute. Mattoon (2003) was the first to propose and this was extended by Elder and Wagner (2013).

Wagner and Elder (2005) explore how state expenditure volatility is affected by the existence, size, and structure of rainy day funds from 1969 to 1999. The authors find that rules based on formulas experience significantly less expenditure volatility over the business cycle. Yilin Hou's work (2003, 2004, 2006) also supports the notion that formulas can increase rainy day fund balances. Furthermore, high caps and minimum balance requirements help state governments develop and maintain adequate rainy day fund reserves.

Given the research reviewed above, it seems the adequate size of rainy day funds should not be determined by a one-size-fits-all rule. Each individual state's rainy day fund size should be determined based on a rigorous analysis of how volatile their revenues have been in mild recessions and deeper recessions such as 2001 and 2008. The literature also suggests that rainy day fund balances have been inadequate. State

governments need to build the size of rainy day funds if they are to be used effectively during a recession. In the following section, I make three specific recommendations to help state governments build larger rainy day reserves.

5.3.2.6 Recommendations for Rainy Day Fund Structure

Overall recommendation – move towards automation and formula based deposit and withdrawal mechanisms. The more rainy day fund deposit and withdrawal rules are left to political discretion, the more likely they are to be underfunded. Several of the studies reviewed above present empirical evidence which supports this theory. The intuition here is clear. Any politician has the incentive to spend as much as possible in any given year instead of saving. During good times, there is political pressure to spend extra funds on constituents either in the form of tax relief or more public goods. Currently, only nine states make deposits into their rainy day funds based on formulas and only 3 states make withdrawals based on formulas. Arizona, for example, calculates the annual growth rate of their revenues and trend growth rate. The relationship between the two determines how much is put into the rainy day fund and how much can be taken out. Other states can use formula based rules similar to Arizona's as models.

Second, target the most pro-cyclical sources of revenue. According to the main results of Chapter 2 the most pro-cyclical sources of revenue are sales and individual income taxes. Previous research has shown that capital gains tax revenue is also highly pro-cyclical.¹¹ Targeting these types of revenue streams would exploit their cyclicity and make the most logical sense to be paired with formula type rainy day rules.

¹¹ See McGranahan and Mattoon (2012), for example.

Third, eliminate all rainy day fund caps. Currently, only five state governments do not have a cap on their rainy day funds. Caps place arbitrary limits on how large state government rainy day funds can grow. Rainy day funds should be allowed to expand flexibly since each state economy will require a different amount of reserve funds.

5.3.3 Utilize the Capital Budget

State and local governments should borrow funds during recessions to conduct capital spending on a countercyclical basis. I begin this section by explaining why it makes sense for state and local governments to engage in countercyclical capital spending. I then briefly review state-local government capital spending behavior historically and over the most recent business cycle. Then, I draw on the major findings of Chapter 3 to discuss the barriers to state-local government countercyclical capital spending. Finally, I present three policy proposals that would support state-local government countercyclical capital spending.

5.3.3.1 Financing Capital Spending

It makes sense for state and local governments to engage in countercyclical capital spending. First, capital spending is not constrained by balanced budget rules. State and local governments cannot borrow to fund operating expenses. But they can borrow to fund capital projects. This means that even though they cannot borrow funds to pay teachers and other public officials, they can borrow to build new schools. Second, a business cycle downturn is usually a favorable time to borrow since the Federal Reserve

generally reduces the federal funds rate – a rate related to the borrowing rates faced by state and local governments – during recessions.

Third, state and local governments should engage in countercyclical capital spending because capital spending is an effective stimulus strategy. The existing literature suggests capital spending is the second most effective way to stabilize the economy during a downturn. Specifically, evidence shows the capital spending multiplier is between 0.4 and 2.2. (Whalen and Reichling, 2015, p. 11). This means a \$1 increase in government spending leads to an increase in output between \$0.40 and \$2.20.

Broadly, this suggests capital spending in a downturn can have positive effects on output and employment which help move the economy out of a recession. Additionally, Heidi Garrett-Peltier (2017) finds that infrastructure spending – which is disproportionately carried out by state and local governments - produces relatively more jobs for a given amount of spending. For example, \$1 million in infrastructure spending creates about ten jobs whereas \$1 million of military spending creates about seven jobs (p. 3).

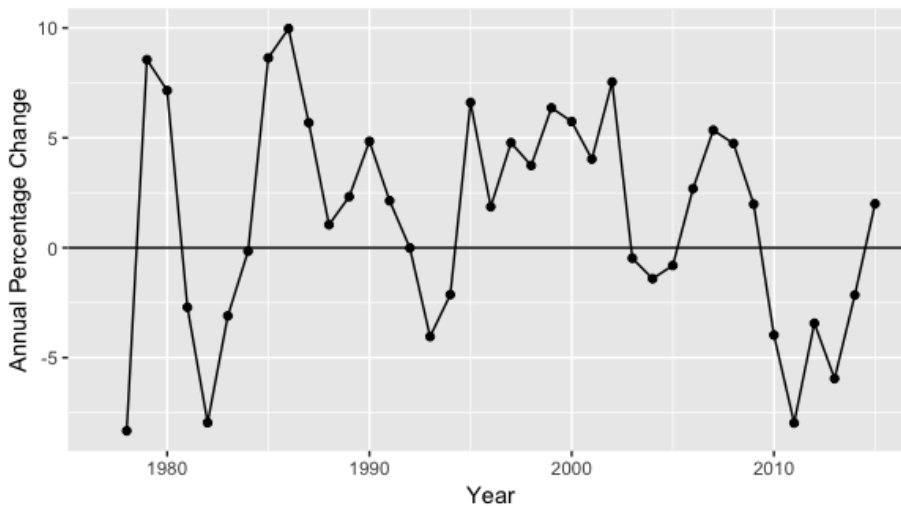
5.3.3.2 State-local Government Capital Spending

Historically, state-local government capital spending behavior has been largely non-cyclical with a weak bias towards pro-cyclicality. As noted in Chapter 2, this is particularly puzzling because much of the public finance literature characterizes capital spending as “postpone-able” meaning state and local governments might prefer to keep people employed than build new infrastructure. If this notion were true, then capital spending should be *more*, not *less* pro-cyclical than operational expenses. On the other

hand, the section above argues state-local government capital spending should be used on a countercyclical basis. Yet, the actual behavior of capital spending seems to fall somewhere in between.

During the most recent recession, the federal government attempted to support state-local government capital spending. The American Recovery and Reinvestment Act of 2009 was a planned \$782 billion increase in government spending, injected into the U.S. economy over a two-year period. The Recovery Act allocated \$290 billion to state and local governments with about \$57.8 billion specifically for infrastructure purposes (Gordon, 2016, p. 5). As Figure 5.3 shows, these transfers did not result in an immediate boost in capital spending growth. During the time we'd expect to see a rise in capital spending growth, from 2010 to 2012, we observe a severe slowdown. In 2011 for example, capital spending was 8% lower than in 2010 for the state-local government sector as a whole.

Figure 5.3: Aggregate State-Local Government Real, Per-Capita Capital Spending, 1978-2015



Source: Census of Governments, author's analysis. Capital spending was deflated using the GDP Deflator

In Chapter 3, I investigated these issues at length. I found that several practical, financial, and institutional factors influenced how capital spending behaves over the business cycle at the state and local government level. Based on the evidence collected from open-ended interviews and a survey of state and local government budget officials, I concluded there are significant barriers to using capital spending for immediate countercyclical stimulus.

5.3.3.3 Barriers for Countercyclical Capital Spending

My dissertation finds there are on-the-ground, practical barriers to using capital spending as an immediate stimulus. First, regardless of the type of financing (federal transfers or own-source revenues), large-scale capital spending cannot be increased quickly. The evidence collected from the interviews suggests that the types of capital projects that would generate the most spending, and hence the most stimulus, are also the types of projects that require rigorous planning and agency coordination. The larger the project, the larger the stimulus, but also the longer it would take to become “shovel-ready” – a term used to describe projects that are ready to immediately to begin construction. One way around this barrier would be to produce designs prior to when they are needed, so when a recession hits, the spending could commence immediately. However, it was clear from the evidence collected that this was not an option. This was due primarily to the fact that designs tend to age quickly. Therefore, it would be highly likely that the design would have to be redone and the funds used to pay for the initial design are largely seen as a waste of taxpayer funds.

Chapter 3 finds two additional barriers to state and local government capital spending. These barriers arise specifically when state-local governments utilize their own-source revenue or borrow to finance capital projects. First, not all state governments borrow to finance capital spending. In fact, several state governments rely almost exclusively on non-borrowed funds to finance their capital projects. Chapter 3 shows that the state governments that rely primarily on borrowing to finance capital spending report more stable capital spending over the recession. State governments that rely primarily on own-revenue sources for capital spending are more likely to report strongly pro-cyclical capital spending. Second, some states may be forced to rely on non-borrowed funds because they have explicit or implicit constraints on borrowing. Chapter 3 shows that debt servicing limits and credit rating agency preferences can impact the amount of funds a state or local government is willing to borrow. State and local governments that have experienced fiscal crises in the past, like Washington D.C. and Philadelphia, are especially likely to be constrained by debt service limit rules. This means that even if these local governments would like to borrow during a recession for the explicit purpose of increasing capital spending to stimulate their local economies, they are unable to do so.

5.3.3.4 Policy Proposals to Support State-Local Countercyclical Capital Spending

The research in this dissertation finds that there are significant barriers to using state-local government capital spending as a large scale, countercyclical fiscal tool in the short-term. However, that does not mean that state-local government countercyclical capital spending cannot be implemented effectively. Here I propose three policy proposals that would support state and local government countercyclical spending.

First, use state-local government capital spending as a long-term stimulus. Absent of any policy or budgetary changes, state-local government attempts to increase capital spending during a recession would result in sizable, sustained spending throughout an economic recovery. This is largely due to the procedural and on-the-ground lags inherent in the capital spending process. A common fear after a recession is that the recovery efforts will not be sufficient, leading to a “double-dip” recession. Intentionally trying to increase capital spending during a recession would provide the national economy with robust, sustained spending several years into the recovery. This would provide a buffer against the economic activity falling back down.

Second, state and local governments should finance their capital spending primarily through borrowing. Out of all potential reasons for state and local governments to borrow funds, financing the creation of long-lived capital assets can be really supported. Furthermore, if state and local governments do not receive sufficient aid from the federal government during future recessions, they may be forced to rely on their own financing methods. For these reasons, state and local governments that rely primarily on own-source revenues to pay for capital projects should shift their financing sources to debt-financing. Although large ticket capital projects will still be subject to the procedural barriers discussed above, there are still several smaller-scale projects that could be advanced relatively quickly. The spending from these types of projects could not benefit the economy if governments are not able to fund them during a recession.

Third, explore transportation department models. The evidence collected in Chapter 3 indicates that transportation departments are the government agency most likely to have “shovel-ready” capital projects – projects that are immediately ready to

commence construction. This is because many of the projects this department's purview are routine projects that do not require rigorous designs such as repaving a highway. Another reason transportation departments are different is because of their relative revenue independence. In many cases, the funding for transportation departments come from sources that are earmarked only for them, for example, toll revenues or license fees. More research should be conducted to examine if and how this revenue independence allows transit department to have shovel-ready projects outside of the smaller, more routine projects. To the extent the transportation model can be replicated in other agencies, the more countercyclical spending can occur on a large scale.

5.3.4 Loosen Financial Constraints

Loosening financial constraints on state and local government would support countercyclical spending. This section outlines two specific institutional interventions that would make it easier for state and local governments to borrow funds for capital spending. First, the creation of a public credit rating agency would remove implicit constraints on state and local government's ability to borrow funds to finance capital spending. Second, direct purchases of state and local debt by the Federal Reserve would increase state and local government's capacity to borrow funds for capital spending during an economic downturn.

Private credit rating agencies are tasked with rating financial instruments based on the risks associated with purchasing them. It may appear at first glance that private credit rating agencies have little to do with state and local government finances, other than the fact that they rate state and local government debt. However, one of the key findings of

Chapter 3 demonstrated that private credit rating agencies can discourage state and local governments from borrowing. This is in spite of the fact that credit rating agencies have no legal authority over state and local government budgets or finances more generally. Chapter 3 explains that credit rating agencies can implicitly, or even explicitly, threaten to downgrade a government's debt if specific fiscal standards are not adhered to. Evidence gathered from the open-ended interviews suggests that the favorable "prudent practices" include balanced budgets, using spending cuts as adjustment mechanisms, and having low debt loads. The theoretical model behind these preferences is that spending during a recession will not stimulate an economy and that higher debt is always necessarily a bad thing. The implications of this for our purposes is that even if a state or local government were willing to borrow funds to stimulate their local economies in a recession, they might not, because of this implicit pressure exerted by credit rating agencies.

One solution to this issue would be to create a public credit rating agency. A public credit rating agency could be designed on the basis of a different theoretical model. That theoretical model would recognize that the stimulus created from deficit spending would be supportive of state and local government spending levels. The agency would therefore not automatically punish governments for having higher debt loads. Whereas private credit rating agencies would reward spending cuts during a downturn, public credit agencies would recognize the harm that can be inflicted by solely austerity measures. Not only do spending cuts during a recession hurt the citizens who rely on vital public services, but it also dampens overall economic activity, worsening the government's fiscal health overall and ability to pay back past debt. A public rating

agency would not pressure state and local governments to engage in local austerity. Therefore, state and local governments wanting to borrow to stimulate their local economies in a recession would be freed from the fear their debt rating would drop precipitously. Diomande, Heintz, and Pollin (2011) and Susan Schroeder (2015) provide a framework for how a public credit rating agency could operate alongside existing private ones.

Another way to increase the capacity of state and local governments to borrow in recessions is for the Federal Reserve to directly purchase state-local government debt. The Federal Reserve has not historically purchased state and local government debt. However, there is a strong case to be made that they should. Konzcal and Mason (2017) argue 1) the Fed's purchase of state-local debt would increase the capacity of subnational governments to spend countercyclically; 2) the Federal Reserve intervened so aggressively to save insolvent private companies such as AIG and Bear Sterns yet would not consider intervening to support municipal bankruptcies such as Detroit or Puerto Rico. The authors further argue that the Federal Reserve could make a standing offer to purchase state and local debt based on a formula of average revenue over recent years, population, or other economic and demographic metrics.

5.3.5 Addressing Political Constraints

Fiscal models that follow from commitments to weaken or eliminate state and local government programs can constrain a state or local government's ability to spend countercyclically. The fiscal models endorsed by the American Legislative Exchange Council (ALEC) are clear examples of this. ALEC self-defines as an organization

dedicated to limited government, free markets, and federalism (ALEC, 2019). They perceive increases in government employment and spending as wasteful and inefficient. The key results of Chapter 4 suggest that ALEC, and the political commitments it represents, counteracted federal government expansionary policy in the wake of the Great Recession. Specifically, the results show that state governments with governors affiliated with ALEC experienced slower growth in total spending, even after taking into account other factors like revenue growth. Clearly, if leaders of state governments implement ALEC models in their states, countercyclical spending is less of a possibility.

5.4 Conclusion

This dissertation has analyzed state and local government budgets over business cycles with the aim of improving the design and implementation of fiscal policy. The key findings of Chapters 2, 3, and 4 have identified several practical and institutional barriers to state-local government countercyclical spending. Chapter 5 acknowledges these barriers and provides concrete policy proposals to expand the countercyclical spending capacity of state and local governments.

The contemporary macroeconomic fiscal policy literature does not adequately take state and local government budgets into account in terms of their impact on U.S. business cycles. State and local governments have largely been neglected in this literature for two main reasons. First, all states except Vermont have balanced budget rules which require in varying degrees that their budgets must be balanced. If these rules were completely binding, state and local governments would have little to no countercyclical spending capacity; their spending would simply reflect their revenues over the business

cycle. Second, early contributions to the fiscal policy literature purported to show that state and local governments do not spend federal transfers. If states and their local governments do not spend federal transfers, they would not contribute to countercyclical stimulus efforts of the federal government. Third, the few studies in this literature that do take state and local governments into account do so in a narrow sense. The focus of these studies is primarily on output and employment multipliers of state governments.

Overall, this dissertation research has demonstrated the importance of state and local government budgets for macroeconomic fiscal policy. State and local government budgets can impact countercyclical stimulus efforts in a multitude of ways. First, this research shows balanced budget rules are not completely binding and therefore investigating how state and local government budgets contribute to macroeconomic fiscal policy is not only an interesting question but an important one. Second, it shows that state and local governments do spend federal transfers. It is clear from this research that state and local governments depend on federal transfers during recessions and early periods of economic recoveries. Third, this research focuses on institutional and on-the-ground barriers to countercyclical spending at the state-local government level and not solely on output and employment multipliers. The core chapters of the dissertation highlighted the actual barriers that state and local governments face to countercyclical spending. Chapter 5 takes these into account and demonstrates that there are clear, feasible policy changes that could be made to strengthen state and local government's capacity to act as countercyclical agents.

The minimization of the pro-cyclical aspects of state and local government budgets and the expansion of the countercyclical aspects of state and local government

budgets is critical to increasing the effectiveness of countercyclical fiscal policy. Economic recessions are costly in terms of lost employment, lost incomes, and lost opportunities. This dissertation research aims to minimize the destruction of economic recessions by improving the design and implementation of fiscal policy through acknowledging the role of state and local government budgets.

APPENDIX A

INTERVIEW PARTICIPANTS

Table A.1: Open-ended interview participants

	Large Population	Medium Population	Small Population
Cities			
	New York City	Sioux Falls, SD	Northampton, MA
	Los Angeles	Shreveport, LA	Edina, MN
	Chicago	Fargo, ND	Logan, UT
	San Antonio		Olympia, WA
	Phoenix		
	Philadelphia		
	San Diego		
	San Francisco		
	Seattle		
	Denver		
	Washington, DC		
	Nashville		
School Districts			
	Hillsborough, FL		Burnsville, MN
	Greenville, SC		Camas, WA
	Cincinnati, OH		Middletown, NJ
	Detroit, MI		Conway, AR
Counties			
	Los Angeles, CA		
	Harris, TX		
	San Diego, CA		
	Fairfax, VA		
	Montgomery, MO		
	Milwaukee, WI		
	St. Louis County		
States			
	CA	VA	NM
	IL	WA	NE
	OH	AZ	ID
	MI	TN	RI
	GA	MD	MT
		MN	DE
		CO	SD
		IA	AK
		KS	ND
			VT
			WY

APPENDIX B
INTERVIEW QUESTIONS

1. Capital spending can be characterized as pro-cyclical (capital spending decreases during recessions and rises during economic “good times”), countercyclical (rises in recessions and fall during good times) or neither. Would you say your government’s capital spending is pro-cyclical, countercyclical or not cyclical?
2. What are the factors that make it pro-cyclical, counter-cyclical, or not cyclical?
3. What barriers (if any) are there if the government wanted to engage in countercyclical capital spending? (These could include but not limited to legal/statutory/institutional barriers as well as barriers to feasibility and practicality).
4. Was the most recent recession different? Did capital spending fall relatively more or less during the recession?
5. Why?
6. Say hypothetically a recession hit tomorrow and your government received stimulus funds from the federal government to be spent only on capital projects, how quickly could they be spent?
7. What types of capital projects are completed the fastest? What types are the longest? What factors can help determine if a capital project will span several years or be completed in a matter of months?
8. Does your government have a legal balanced budget rule?
9. Does your government need voter approval to sell bonds?

10. Are there many opportunities to alter the budget after it is passed? If yes, do changes occur frequently? Does this increase during recession years?

Capital spending is different from operational expense spending in that once contracts are made between the government and the contractor for a capital project are signed, it may take many years to complete the project. So in any given year, some percentage of the government's capital spending is from previous years contracts.

11. About how much capital spending would you say is new?

12. Would the government ever break a contract? Does this happen more frequently during recessions because of lost revenues?

Often during a recession, a government's revenues decline, forcing it to engage in operation budget expense cuts which can often lead to government worker layoffs.

13. Could lack of personnel ever be a reason for reduced capital spending during a recession? Or are all the workers that do the administrative work for capital projects paid out of the capital budget?

14. Are there other things that would help me understand the pro-cyclical or counter-cyclical of capital spending that we haven't discussed?

APPENDIX C

CLASSIFICATION OF ALEC STATES

Table C.1: Recording of sources used to classify ALEC states

State	Governor	ALEC Award Winner	ALEC Politician	ALEC Alumni	ALEC Featured Speaker	ALEC speaker, alumni, or politician
LA	Bobby Jindal	x				
TX	Rick Perry	x				
OK	Mary Fallin	x				
AZ	Jan Brewer		X			
IA	Terry Branstad		X			
SC	Nikki Haley		X			
OH	John Kasich		X			
VA	Bob McDonnell		X			
WI	Scott Walker		X			
GA	Nathan Deal			x		
IN	Mike Pence				x	
FL	Rick Scott					a
KS	Sam Brownback					b
ME	Paul LePage					c
MI	Rick Snyder					d
NJ	Chris Christie					e
Source		CMD	CMD	ALEC	CMD	CMD/ALEC

a. ALEC Featured Speaker. Source: ALEC, <https://www.alec.org/article/all-speakers-from-the-alec-states-and-nation-policy-summit/>

b. ALEC featured speaker and Brownback hired ALEC consultant Arthur Laffer to develop KS tax plan. Source: CMD, <https://www.prwatch.org/news/2014/05/12467/alec-kansas-city-missouri>

c. ALEC featured speaker. Source: CMD, <https://www.prwatch.org/news/2015/11/12981/alec-agenda-scottsdale-2015>

d. ALEC bill promoter. Source: CMD; <https://www.prwatch.org/news/2018/12/13432/michigan-gop-defies-voters-rams-alec-koch-priorities-through-lame-duck-session>

e. ALEC bill promoter. Source: CMD, <https://www.prwatch.org/news/2011/08/10944/publicopoly-alec-and-bid-make-private-all-public>

see also MSNBC: <http://www.msnbc.com/rachel-maddow-show/christie-backs-alec-agenda-new-jersey>

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